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MILITARY REVIEW

DECEMBER 1944 • VOLUME XXIV • NUMBER 9

REFERENCE DEPT.



COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

A MONTHLY REVIEW OF MILITARY LITERATURE

A Christmas Gift For the Whole Year

With the approach of winter many at home are already thoughtfully considering the Christmas season and the gifts which will be sent to those in the Army. All those in the armed forces now will become more and more aware of the approach of Christmas with each passing day; and they also are thinking of the gifts they would like to send home.

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COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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THE COMMAND AND GENERAL STAFF SCHOOL MILITARY REVIEW — Published monthly by the Command and General Staff School at Fort Leavenworth, Kansas. Entered as second-class matter August 31, 1934, at the Post Office at Fort Leavenworth, Kansas, under the Act of March 3, 1879. Subscription rates: \$3.00 per year for 12 issues in the United States and possessions. Foreign subscription \$4.50.

Administration, Supply, and Evacuation of the 77th Infantry Division on Guam

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Commanding General, 77th Division

SINCE so little has been written on administration, supply, and evacuation in an action, at the editor's suggestion we shall concentrate on those activities, describing only sufficient operations to get the big picture.

On 21 July, the 305th Combat Team landed with the First Provisional Marine Brigade and assisted in establishing beachheads in the vicinity of Agat and Facpi Point (see Figure 1). The remainder of the division, initially in corps reserve, started landing on 23 July, relieving the Marines on their lines to the east of the shore so that the First Provisional Marine Brigade could turn and take Orote Peninsula. The 77th Division improved its positions, straightening out lines, capturing key terrain, and intensively patrolling the southern half of the island. On 31 July, in conjunction with the 3d Marine Division, the 77th Division attacked until it reached its final objective, which was Mount Santa Rosa and Pati Point.

It was an odd campaign. Sometimes our advances approached a pursuit; sometimes mud and jungle slowed us up; and the Japs were always present in between. One of the main battles the division fought was over the town of Barrigada, which had the only water supply for miles around. The whole scheme of maneuver that day was based around that water point. One action that required an enormous amount of G-4 activity was at the battle of Yigo, where bombers flown from Saipan bombed Mount Santa Rosa, naval guns took up the fire and protected the flanks of the division, and a twenty-minute preparation by both corps and divisional artillery was delivered requiring a large amount of ammunition. In the following tank attack four tanks were lost, which is a serious matter when they have to travel so great a distance to get to these islands.

Such was the tactical operation of the 77th Division in the Guam campaign—one which

complicated, by the rapidity of the advance, supply functions which were already made difficult by a variety of factors including reef conditions, bad roads, mud, and lack of necessary heavy equipment.

Administrative planning for the Guam operation began early in April, approximately ninety days prior to the assault, and was continuous until the division landed on the beaches assigned to it. Perhaps the most logical way to discuss the supply plan is to follow the administrative order to determine what was attempted, what difficulties were encountered, and what was learned.

Under the heading of Class I supplies, rations were carried at the following levels; twenty days' 10-in-1 ration pack, seven days' type "C," three days' type "K," two days' type "D," twenty days' supply of ration accessories, and two special assault candy rations per man. No "B" rations were carried on the advice of corps owing to shipping limitations and the fact that it was contemplated we could draw them from garrison force units. The 10-in-1 ration pack proved to be very satisfactory since it is compact, easy to handle in combat, and simple to issue to front-line units because no breakdown is required.

Water was carried on transports at the level of two gallons per man per day—a total of approximately 190,000 gallons for the division—in 5-gallon cans and 55-gallon drums. We had intended to carry all of our initial water supply in 5-gallon cans, but since sufficient numbers of these were not available the 55-gallon drums had to be substituted. We were able, by early establishment of distillation units on the beach, to reduce the use of these drums to a minimum and to keep them as a reserve. When it became necessary to use the water in this reserve, we emptied the drums into 5-gallon containers to facilitate handling and supply to forward units.

Water supply was a difficult problem on

Guam. It was solved initially through the operation by each shore party battalion (we had three) of water distillation units on the beach, which were established immediately upon landing. Each RCT [regimental combat team] carried one water point unit.

When the eastward advance got under way, the supply of water almost became critical for a short time owing to the difficulty of transporting it forward over the limited road net and the lack of suitable water points in the zone of advance. By moving six distillation units to Pago Bay we were able to keep the front-line units supplied. We concentrated on the early occupation of the town of Barrigada in order to capture intact, before the Japanese had an opportunity to destroy it, a well which we knew existed there and which was very important to us. We were successful in taking it, and the 30,000 gallons per day it supplied materially reduced our water problems. Through constant effort and the application of every means available, at no time during the campaign did the division feel the lack of ample water.

Class II material—maintenance items of clothing, equipment, and general supplies—were carried at the level of twenty days' supply. Bulk clothing and individual equipment carried by RCT's was equally distributed in all ships and was to be landed sufficiently early to provide emergency clothing replacement in the event duffle bags could not be made immediately available, but owing to lack of transportation it was impossible to get these supplies forward to the troops. We did succeed in issuing new clothing to men in hospitals who were admitted with muddy, gory, or torn uniforms; but most of the troops had no opportunity to change clothing for about thirty days, which was definitely not good.

One of our biggest headaches under Class II supplies was the requirement to carry impregnated protective clothing. The bulk necessary to equip a division is tremendous. The assault gas mask, however, should be retained.

A standard roll consisting of a shelter half, one blanket, mosquito bar, one "K" ration,

cake of salt water soap, pack carrier, tent pole, five pins, a pair of mosquito gloves, and a waterproof clothing bag was developed by the division in an attempt to supply the troops with these items without the necessity of segregating rolls by company and individual. It was a good idea, but again owing to lack of transportation and the condition of the roads, it was impossible to get them forward to the troops.

Class III supplies were also carried at the twenty-day level and were packed in 5-gallon and 55-gallon containers and in 50-pound pails for heavy gear lubricants. Because of the variety of equipment we had with us it was necessary to carry aviation gasoline for our liaison planes; leaded gasoline and Diesel oil for trucks, tractors, and tanks; white gasoline for kitchens; and a variety of weights of engine oils and gear lubricants. Containers were suitably marked and segregated in dumps, and no difficulty was experienced in keeping equipment in operation so far as fuels and lubricants were concerned.

Class IV supplies were mainly limited to engineer and chemical warfare equipment. Approximately 225 tons of engineer items were carried which included twenty days' supply of Summerfeld matting and fortification materials such as barbed wire, pickets, sandbags, etc. The bulk of this equipment could be materially reduced since it is not needed on an operation of this type where the mission is to attack and not to defend. Chemical warfare items comprised about forty tons and included flame throwers, their service kits, and fuel.

Class V supplies were loaded at the level of ten U/F for antiaircraft weapons and seven U/F for all others. The amount proved adequate. The magnitude of the ammunition supply problem is clearly seen in the expenditure figures for the division in small arms alone: approximately 3,600,000 rounds of caliber .30; 750,000 rounds of caliber .30 carbine; 475,000 rounds of caliber .45; and 46,000 hand grenades.

For initial combat supply, all troops landed with one "D" and one special assault candy

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FIGURE 1.

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ration on the person and one of the latter in the combat pack. They also carried two filled canteens of water and the prescribed allowance of ammunition for the weapon with which they were armed. Vehicles went ashore with fuel tanks ninety percent full, and with ten gallons additional fuel and one gallon of oil in containers.

Initial resupply of rations was to have been provided by the "K" ration in the stand-

ard roll; but since these could not be transported forward, initial resupply was effected from beach dumps. Each company and battery carried standard boxes of quartermaster and ordnance cleaning and preserving materials, and standard boxes of expendable signal items such as batteries and tape which kept them going until normal supply started to function.

For subsequent resupply it was contem-

plated to unload ships in accordance with priorities established in debarkation priority tables. The plan was good, but many factors made its execution extremely difficult.

The bulk of equipment for the resupply phase was carried on four-by-six-foot pallet sleds. The use of pallets in amphibious training exercises in the States, where conditions were such as to allow small boats to be beached, had indicated that pallets provided a quick and easy means of transferring large amounts of supplies and equipment from transports to beach dumps, since it was only necessary to beach a landing craft, hook a pallet or a train of them to a bulldozer or tractor, and drag them directly to the dumps.

On Guam, however, this system didn't work because landing craft couldn't be beached owing to the presence offshore of a reef extending seaward an average distance of 300 yards, which landing craft could not cross at any tide. The water between the seaward edge of the reef and the beach was too deep, and coral heads and potholes too numerous, to permit pallets to be drawn across the reef without severe damage to the equipment they contained. The only way they could be handled was to transfer them by cranes at the reef edge from LCVP's to DUKW's, LVT's, or Navy ponton barges and then transport them across the reef to beach dumps where cranes were again necessary to unload them. This method called for much heavy cargo-handling equipment which the division did not have, and accordingly many pallets were broken up so that the equipment on them could be manhandled at the transfer points.

Approximately 5,000 pallets were prepared and loaded for the Guam operation, although it is doubtful that more than 1,000 of these reached the beach in their original form. Doubts as to the feasibility of handling cargo in this manner arose even as early as the transport loading phase of the operation when it was found that much valuable shipping space was being lost because pallets would not fit into available spaces and corners in holds and that they were difficult to handle in confined hold spaces especially where

finger-lifts were not available. About 1,000 of them were dismantled even before they were loaded aboard ship.

The absence of channels through the reef by which landing craft could be brought to the beach was severely felt and emphasized the fact that a division landing on a beach such as the one we used on Guam is almost entirely dependent upon the Navy whose job it is to blast usable channels. The lack of channels on this operation necessitated the debarkation of vehicles and equipment at the edge of the reef, from which point vehicles were waded to the beach. This could be done only at low tide, and even then many vehicles drowned out owing to the depth of the water and had to be towed ashore and dried out. This operation further emphasized a known fact—that landings are greatly dependent upon tidal conditions.

The number of small boats available to bring supplies to the reef was more than adequate under the circumstances and resulted in a far greater volume of supplies arriving at the reef edge than the shore parties were capable of transferring to the beach with the equipment available to them. Every possible expedient was used—cranes, ponton barges, and LVT's were borrowed from Marine and Navy units; the division's sixty DUKW's were pooled and operated continually under G-4 control; and supplies were even floated ashore on life rafts made available from the transports and on ten-man rubber boats which had been brought along for use of the reconnaissance troop.

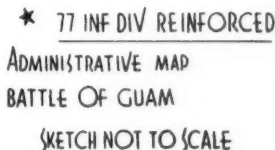
Unloading activities were further complicated by conditions inland from the beach. We landed on a beach over which the 1st Provisional Marine Brigade had previously operated, and although the Marines had moved out, they had not yet been able to transfer all their equipment. The beach dump area also contained initially a battalion of artillery and an LVT repair pool; accordingly, we were forced to "fill in the cracks" in establishing beach dumps, and supplies had to be stacked wherever space was available.

Mud and continual tropical rains raised further problems. Vehicles frequently took

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In the face of the difficulties noted, it became apparent very early that the ships of the division could not be unloaded on a dawn-to-dark basis only; accordingly, beaches were illuminated by floodlights powered by the 5-KVA generator units of the shore parties, and unloading proceeded on a twenty-four hour basis. Fortunately for supply, the enemy tactical situation permitted this—he had no air and was unable to use his artillery

against our beaches. Night work resulted in having all APA's eighty percent unloaded at the end of the first five days. Total elapsed time to unload all ships was twenty-one days in spite of the tremendous difficulties encountered, including a severe tropical storm which effectively halted all unloading operations for three days.

The tactical situation further complicated an already undesirable supply situation at the beach dumps. In the typical operation, troops continue to move inland after the initial landing, and consequently supplies soon start to flow forward, relieving the congestion near the beach. In this operation, however, the division occupied the FBL until the morning of 31 July, and supplies continued to telescope behind it in beach dumps which had been inadequate from the beginning.

When the pressure was finally released by the eastward advance of the division, which began on 31 July, the release was so explosive in nature that within a short time a gap of sixteen miles had developed between the division supply dumps and the front-line troops. The construction of a MSR [main supply road] had been initiated which was to follow the assault troops to the eastern side of the island and thence north behind the route of advance. Difficult terrain conditions, torrential rains, and the rapidity of the advance soon made it clear that we could not hope to supply the division over this route and its construction was accordingly abandoned late the first day of the advance.

Plans were made to use the Agat-Agana-Pago Bay road as the MSR in conjunction with the 3d Marine Division as soon as it was cleared of the enemy. The road was secured by the afternoon of 1 August and supplies immediately began to flow forward over it. We were faced with the anomalous situation of supplying the division over a long, tortuous route which was also serving a Marine division, corps artillery, and later a Marine brigade as well. The books would say it can't be done, but on Guam it was done—it had to be. We did it by using all available transportation and keeping it on the go day and night. Once again the lack of enemy air

and artillery permitted the application of immediate action remedies for a serious "first position stoppage," and the supply machine continued to function.

It was early realized that the pursuit into which the tactical situation was rapidly developing could not long be supplied unless division dumps were displaced forward. Displacement began on 1 August, and when the initial loads came in they were dumped at a point of my personal selection within 200 yards of the front. By 2 August the dumps were well established in a position 400 yards forward of the advance division command post, which was at that time less than two miles from the front. Hardly, it might be said, the approved solution; but the only one possible in this particular situation. These dumps were so far forward that they served for the remainder of the campaign without further displacement.

Medical and signal resupply was effected by informal requests of using units through the Division Surgeon and the Division Signal Officer. Available medical transportation which was used to evacuate casualties to the rear picked up supplies and carried them forward on return trips. A small stock of emergency signal supplies was maintained at the forward command post from which units at the front were supplied on a replacement basis, and if needed items were not available here a message was sent to the signal dumps in the rear and the equipment was sent forward on the first available transportation.

Combat resupply on Guam was hampered by numerous difficulties, but we managed to accomplish it satisfactorily. At no time was any of our front-line units unable to get anything it needed, and never were they lacking food, ammunition, or water.

Evacuation of casualties followed normal procedure within the division and was remarkably fast considering the terrain over which it was accomplished—wounded men were in most cases in a place of definitive treatment within sixty to ninety minutes after being injured. This proved to be a great morale factor, since men felt they would be quickly and properly cared for if injured.

Most of the wounded were evacuated by jeep ambulance, although DUKW's were frequently used for longer trips to beach evacuation stations and to hospital ships. The jeep ambulance performed admirably; but on a large land mass the size of Guam, larger vehicles should be provided for the more comfortable evacuation of greater numbers in one trip.

Burial of our own dead was handled expeditiously and efficiently by a team organized within the division and supervised by the quartermaster company. The cemetery was established initially in the vicinity of Agat, but the final division cemetery was located at Agana. Enemy dead were buried by units in unit areas as soon as the tactical situation permitted. Each division should have a trained graves registration unit assigned to it. The lack of one was not felt here, but would have been had the number of men killed been greater.

We made a strenuous stab at salvage in this campaign, but the results achieved did not satisfy us. Combat units do not have the personnel, the transportation, nor the time to do a proper job of salvage; they should be followed by corps service troops who are equipped for this work. When an army unit the size of a division is not with a corps that has a QM laundry unit, such a unit should be attached to salvage herringbone twill and other clothing items that are turned in and to give the men an opportunity to have clean clothing occasionally. This is a strong morale factor which is frequently overlooked. At present we are manufacturing improvised mechanical washing machines in the field in an effort to recover equipment.

Salvage of our own and of captured enemy material was further hampered by road conditions which rendered inaccessible large dumps of enemy supplies. Our efforts are continuing, and as roads improve, increasing amounts of equipment are being recovered.

Prisoners of war were handled in the normal manner. They were not much of a problem, however, since only thirty-six were taken by this division in the entire campaign.

Roads, or rather the lack of them, were perhaps our biggest headache throughout

the entire campaign. The road net was inadequate to begin with, particularly on the eastern side of the island in this division's sector. Those roads which did exist soon became almost impassable because of heavy rains and the volume of traffic which necessarily traveled over them. We lacked heavy engineer equipment with which to maintain existing roads, and this fact coupled with difficulties of terrain frustrated our attempts to build new ones. In one case, parts of destroyed Jap tanks and twenty-five truckloads of coral failed to fill up one mudhole.

In order to keep our supplies moving forward and to take advantage of the few good roads, we frequently had to supply our units over routes located in the 3d Marine Division sector which they were also using, and they in turn used our roads. When this was done we established joint traffic control posts with MP's from both divisions—a system which worked very well. Traffic control under such conditions must be well organized and closely supervised.

In one case near Barrigada one combat team had no road in its sector over which it could be supplied. It was necessary for this combat team to attack vigorously to capture a road to its front which connected with a supply route in the sector of the adjacent combat team, and then pause to be supplied over the road it had just taken. Supply routes for battalions frequently had to be bulldozed through the jungle, and for this reason in jungle terrain we found it simpler to pass a freshly supplied battalion through one whose supplies had been depleted and then resupply the latter while it was reorganizing.

The necessity of using all roads to the maximum resulted in our night limiting point or "light line" being farther forward than it normally might have been. Vehicles operated on a twenty-four hour basis, using lights as far forward as the advance division command post and in some cases as far as regimental dumps at night. Here again enemy lack of air and artillery favored our supply.

Supply trains under conditions which prevailed on Guam must be controlled by G-4 for

maximum efficiency in their use. One of the first things we did after landing was to establish a pool of all trucks and DUKW's of the quartermaster company and all DUKW's of infantry regiments and artillery battalions. This pool was controlled and operated by G-4 for the remainder of the campaign. Where the road net is limited and combat supply difficult, such control of trains is necessary.

The operation of a normal straggler line was hampered initially by congestion in the beach area and later by rough terrain and lack of roads. Normally, a line would be established around the beachhead, but we had only one road into the beachhead which was being used by Army, Navy, and Marine units, resulting in such congestion it was hard to tell who was who. In place of a regular straggler line, we organized joint patrols of Marine and Army personnel to police the area in the vicinity of the beach and to check all kitchens at chow time. All stragglers found by this method were returned directly to their units. As our assault battalions progressed inland, each established its own straggler line. This plan worked very well.

Mail service to troops was excellent and proved to be a great morale factor. Some mail was picked up en route to the target, broken down on shipboard, and delivered to the troops on the transports before they landed on the beach. Our APO was ashore and in full operation for both incoming and outgoing mail by D plus four days. The importance of mail to troops in combat cannot be overemphasized.

No heavy personnel tentage except T/E for hospital units was taken for shelter on this operation, owing to lack of shipping space and the fact that we did not contemplate a long stay on the island of Guam. However, the T/E allowance of tents and cots for our hospitals was inadequate owing to overcrowding, and much of it was pilfered on the beach. Some excess tentage should be carried to insure adequate shelter for casualties.

In regard to G-1 reports, we found that the information listed on page 112, FM 101-5,

though desirable, is not necessary in the form prescribed. The information required in a G-1 report during combat is mainly the effective strength of the command at any given time, with the reasons therefor in general terms of killed in action, wounded in action, missing in action, sick, and returned to duty. Since the campaign ended, we have worked out a simplified columnar form for G-1 reports which can easily be sent in the clear by telephone or radio.

A special effort was made in this campaign to reduce the number of men classified as "missing in action." All personnel were thoroughly instructed in preliminary training to notice and report upon all cases of injury which they observed in combat, with emphasis on location, time, type of wound, name of injured if known, etc. In a number of cases these reports provided positive identification where normal means failed, with the result that we had only one man "missing in action" when the hostilities ceased.

Because the Guam operation was anticipated to be of short duration and since no need for money on the island was contemplated, troops were last paid in full without exception to include the end of the month preceding embarkation. However, \$250,000 was brought along to take care of any emergency and to provide an opportunity for officers and enlisted men to receive a substantial partial payment if they so desired upon the cessation of hostilities. The plan has worked well and so far no complaints have been heard. Most personnel have preferred to leave their accrued pay in the hands of the Finance Officer.

Owing to the shortage of troop space on transports it was necessary for us to leave behind certain personnel in the staging area. They formed a provisional "rear echelon" composed of some cooks, company clerks, certain administrative personnel, and drivers of T/E vehicles which could not be carried. Their need in combat was not contemplated so they followed the division on resupply transports.

Every effort was extended toward increas-

ing the comfort of the uniform and reducing the amount of individual equipment to be carried. We landed and fought in herringbone twill with helmets and leggins, carrying weapons and a light combat pack. The uniform was satisfactory but the combat boot would be preferable to leggins because the latter are hard to handle in the mud and rain. Some protection for the legs is necessary against mud, brush, and insects in this type of terrain.

Civil affairs problems were a headache on Guam. The division Judge Advocate was designated Civil Affairs Officer, and despite the fact that garrison forces took over, the division itself brought in over 4,000 civilians by sending out strong patrols. We had to feed them and provide necessary medical attention en route to rear areas. Two of our medicos even volunteered to go into enemy territory to treat civilians who were not well enough to move.

We learned a number of lessons from the Guam campaign, some of which were new but most of which were known beforehand and were only emphasized by our experience here. Some of these lessons are set down here in the hope they may be of value to other units operating in similar terrain.

1. More transportation is needed on an island the size of Guam. We operated here at considerably less than the T/E level on vehicles; but we found that operations on a large island mass, after the initial landing, are essentially the same as any normal land campaign. T/E vehicles are necessary, and prior planning with regard to allocation of shipping space must take this into account. Ample stocks of spare parts must also be carried to keep all vehicles in continuous operation.

2. Where the road net is limited and terrain conditions difficult, road maintenance must be continuous. In order to accomplish the task, much heavy road building equipment not normally carried by division engineers must be included. We needed road graders, power shovels, and rollers very badly. All we had

were bulldozers and tractors which were not sufficient for the job.

3. Great care must be exercised in making a decision as to the percentage of supplies to be palletized. We learned that:

a. Pallets tend to take up valuable shipping space which could be used otherwise to better advantage.

b. Heavy equipment such as finger-lifts and cranes is required to handle them, which equipment takes up further cargo space.

c. They cannot be handled expeditiously under conditions such as those prevailing on Guam where reefs prevent beaching of small boats.

4. As an all-around supply vehicle in terrain similar to that on Guam, the DUKW is preferable to the LVT. The latter is better for swamps, rice paddies, and lagoons, but where roads are available from beach dumps to the front lines, the DUKW is very successful. Artillery units can be brought ashore quickly in DUKW's without the necessity of waiting for LVT's used in assault waves to make return trips. The DUKW stands up well in coral reef operations, requires less maintenance, is relatively easy to handle, and causes less damage to roads. Even when our DUKW fleet suffered broken propellers, for which we had few replacements, they could still be used on land. They are relatively easy riding and provide an excellent means of evacuating casualties from clearing stations direct to hospital ships.

5. In marking organizational and other equipment, don't put a copy of the packing list on the outside of the container. It doesn't help the one to whom the property belongs since he can determine the contents of a box from its number, and it serves only as a convenient means for looters to decide whether they want to appropriate a particular box or not.

6. Immediately your supplies start coming ashore you must establish guards over them to prevent pilfering and looting by other units. This applies to all types of supplies, including personal baggage.

7. Plans must be flexible and functional. It is relatively easy to conceive a workable supply plan based upon a known tactical concept, but the execution of such a plan may be rendered difficult almost to the point of impossibility by conditions which are unforeseen or unforeseeable.

8. Nothing can take the place of extensive and complete prior G-4 planning, adequate reconnaissance, and thorough knowledge of beach, tide, and terrain conditions. During combat, however, G-4 ceases to be a planning agency and becomes an operating agency. He may be able to put his plans into operation "by the book," but departures from established doctrine will frequently be dictated by local conditions, as they were here.

9. The 10-in-1 ration pack should be supplemented by "B" components such as flour, condiments, fruit juices, etc., for variety. Wooden or pressed paper forks and spoons should be provided for sanitary reasons, and salt tablets should be included for the health of the troops. The addition of a supply of V-mail forms would be a welcome morale factor.

10. The special assault candy ration, composed of about two dozen small pieces of hard candy, one commercial candy bar, a package of cigarettes, and a box of matches, did not prove satisfactory. The cigarettes were appreciated, but the candy did not sustain the troops and they soon tired of it.

11. Fifty-five gallon drums for carrying water are not suitable for a landing operation. They are too bulky and difficult to manhandle. Five-gallon containers alone should be used for initial supply.

12. The duffle bag proved to be a considerable nuisance. It is carried along with the troops to save shipping space on transports, but we found these bags get lost, they get dumped off in the mud at night, they get punctured by odds and ends of equipment, and even get slashed open and rifled by looters. Once a base camp is established for two or more operations, it might be feasible to leave the duffle bag there, issue each man a small ditty bag, and then issue him clothing as subsequently required.

13. When the situation calls for the continuous operation of vehicles as it did in this campaign, assistant drivers are absolutely essential to provide necessary relief for regular drivers. All our supply vehicles had relief drivers; without them we could not have functioned as we did.

14. G-1 reports should be submitted as of 2400 in order to simplify cross-checking against Admission and Disposition sheets of hospitals, Morning Reports, and Graves Registration reports, all of which are made as of 2400.

Administration, supply, and evacuation on Guam were difficult, but that is to be expected where terrain and natural conditions as well as the Jap are your enemies. In the words of Commodore H. B. Knowles, USN, commander of transports which carried this division and who has been in Guadalcanal, Attu, Tarawa, Kwajalein, and Saipan: "Your people have landed and supplied themselves over the toughest reef yet worked by any outfit in this war."

It is felt that horse cavalry would be of great use in the Italian theater. The country is extremely mountainous, and mechanized cavalry and armor are to a great extent limited to the roads, whereas horses would be able to go almost anywhere. The types of operations for which horses would prove desirable are day and night patrols; for screening; to exploit a breakthrough; and to cut off, pursue, and harass a retreating enemy to prevent his making an organized stand.

—From a report by an observer in Italy

Employment of Tanks and Infantry in Normandy

Prepared by G-3 Division, Supreme Headquarters Allied Expeditionary Force, for publication in the MILITARY REVIEW, Command and General Staff School, Fort Leavenworth, Kansas. The material was obtained from commanders and observers with United States forces operating in northwestern France.

SHORTLY after Allied Forces had penetrated the outer crust of Nazi coast defenses in northwestern France, reports began to filter back of the new infantry-tank tactics that were being developed as the result of



FIGURE 1.

TYPICAL HEDGEROW-INCLOSED ROAD IN NORMANDY.

the unusual terrain in Normandy. The hedgerow had proved to be a formidable barrier.

It is still too soon to expect the commanders who fought over this terrain to give their complete and carefully considered "approved solutions" for this type of attack. They are looking at the job ahead, rather than conducting a post-mortem of the battles just won. However, by piecing together their comments, and by studying the methods that did succeed, one comes to the conclusion that basic pre-invasion infantry-tank doctrines still remain sound. They had to be applied with a bit of ingenuity and a tremendous amount of energy, but they did produce results even in the hedgerow country.

The typical hedgerow is composed of a line of trees, up to two feet in diameter, and heavy brush which grow on top of a ridge of earth from three to eight feet in height. Frequently there are ditches on one or both sides of the

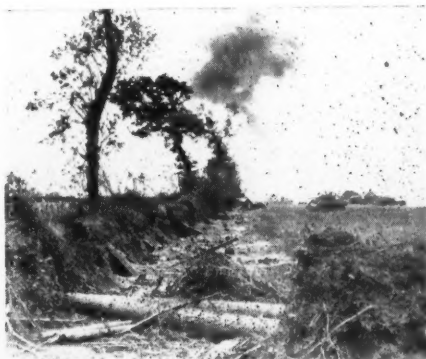


FIGURE 2.

TYPICAL HEDGEROW IN NORMANDY WITH MOST OF VEGETATION SHOT OFF.

hedge. These hedgerows afford natural protection for enemy infantry and at the same time serve as ready-made tank obstacles. They limit observation in the low, rolling Normandy country, which has few high points for observation. It has been said that they cut the terrain into separate squad and platoon battlefields, and that fighting is similar to that in woods and jungles. This was to the advantage of the defending Germans, who made the maximum use of the cover and concealment so provided.

The Germans frequently organize their defensive positions over a series of three hedgerows. When the first defended line is threatened, the garrison withdraws, usually along connecting hedgerows, under cover of fire from the next defended line. Withdrawing personnel may either reinforce the second line or continue to the third line, prepared to cover a withdrawal from the second. In addition, the Germans use a leap-frog system of defense, which enables them to continue effective resistance, even after the loss of the

rearmost hedgerow of the original position.

The first defended hedgerow is usually occupied by only a few men, some of whom are armed with machine pistols. Sometimes a single individual armed with an automatic weapon will move rapidly from place to place firing one or more bursts at each point for the purpose of creating the impression that the holding force is much larger than it is. These men are dug in at the hedgerow corners

The entire position is defended by the fires of mortars and artillery which may range in caliber from 75-mm to 240-mm. Shells used are both time fuze and ground impact. Artillery and mortars are almost invariably registered in on hedgerow corners, gaps in hedgerows, and other obvious critical points, such as crossroads and road junctions. Fires are quickly and accurately brought down on previously registered critical points and on at-

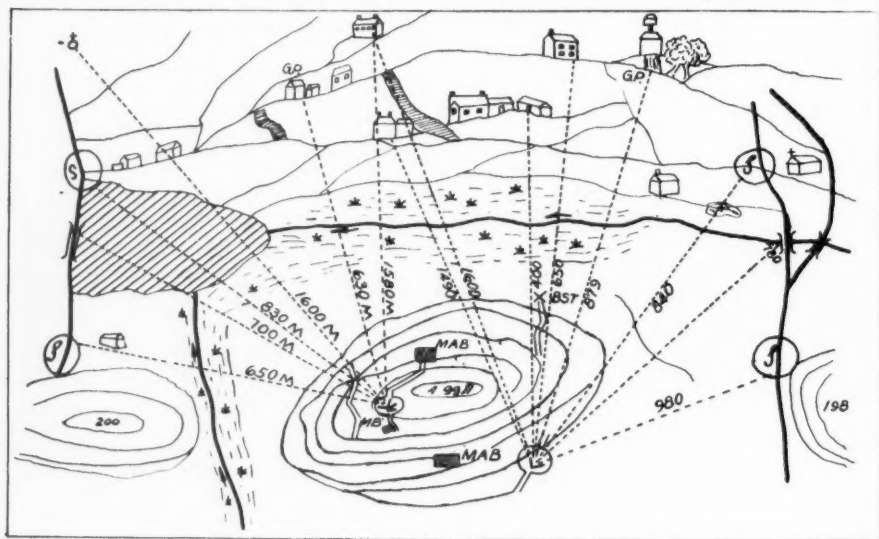


FIGURE 3.

CAPTURED GERMAN SKETCH SHOWING THE MINUTE DETAIL OF THEIR PRE-ARRANGEMENT OF FIRES IN DEFENSE.

and along the reverse slope of the bank. Their foxholes are frequently dug at an angle with the horizontal, tending to reduce losses from air burst and WP shells.

The second defended hedgerow usually is held by riflemen and machine gunners similarly dug in. Sometimes tunnels are dug through the bank and the machine guns are fired through these tunnels. The machine guns also are frequently emplaced to command gaps, already existing or made for the purpose, in hedgerows to the front.

The third defended hedgerow is prepared for occupation and is sometimes initially occupied by riflemen and automatic weapons.

tacking personnel who stop in the open. Observers state that guns as large as 88-mm will fire on as few as two exposed individuals. German artillery also obtains an excellent effect by firing into the tops of trees near attacking personnel, thus causing heavy casualties from the resultant tree bursts.

The defensive area is permeated with snipers, whom the Germans use freely to contribute to the delaying effect of their organization. These snipers may be found in trees, buildings, towers, and similar vantage points. Some are carefully placed before a unit withdraws; others, not observed as the attackers pass, remain hidden and assume the sniper

role. when to pi other loca them have weap snipe ous move resu fire to be Th boob will near caus worl In tion supp cult ploy tion by whi easi uns gre of hed to t tan the wit bre nee the cov whi clo for De vis field exp rap

role. Snipers seldom fire on large groups or when there is a lull in combat. They prefer to pick off one or two men and to fire when other battle noises increase the difficulty of locating them by sound of the shot. Some of them are equipped with .25-caliber rifles which have a less noticeable sound than the larger weapons. Consensus of opinion is that the snipers are poor shots and constitute no serious threat to individuals who continue to move. The snipers' most successful efforts result from immobilizing a group by their fire long enough for artillery or mortar fire to be brought upon them.

The Germans also sow antitank mines and booby traps freely. Booby traps frequently will be found at openings in the hedges and near parallel hedgerows, where they will cause casualties if our troops attempt to work along or through them.

In attacking these German defensive positions, the lack of observation has made close support by artillery and mortars very difficult, with the result that tanks have been employed to supplement their fire. Tank operation, in turn, has been made more hazardous by the many hedgerows and sunken roads, which tend to canalize tank movement; by the ease with which enemy infantry could ambush unsupported tanks and knock them out with grenades and bazookas; and by the prevalence of antitank guns so cleverly concealed in hedgerows that they were not detected prior to their opening fire. In avoiding roads, the tanks had to force their way over or through the hedgerows. Some tanks were equipped with special blades so that they could open a breach for themselves. In other cases, engineer troops blasted out gaps through which they could pass. The infantry provided the cover for the tanks, and for the engineers when they formed part of the team.

The attack in this type of terrain, as in any close country, is marked by conflicting needs for decentralization and for close control. Decentralization is necessary because limited visibility tends to isolate the fight in each field. Control is necessary to insure against exposure of a unit to flanking fire by a too rapid advance. The need for decentralization

is largely met by the formation of small semi-independent teams capable of capturing a single field or two adjacent fields. The need for control is met in one or more of the following ways:

a. Telephone lines from battalion to company commanders to permit frequent reports. Reporting of locations is facilitated by assigning arbitrary numbers to the fields.

b. Numerous phase lines (usually specified hedgerows) on which coordination is obtained before further advance.

c. The inclusion of each parallel hedgerow in the zone of advance of a small unit, to in-



FIGURE 4.
HOLE CUT THROUGH A THICK HEDGEROW BY BLADES
MOUNTED ON TANKS.

sure the interest of its leader in the situation on both sides and to facilitate mutual observation by adjacent units.

d. Special measures for infantry-tank communication. Some units install infantry telephones on certain tanks and connect them with the interphone communication system. In others, the infantry is provided by the tank unit with a tank radio.

e. Depth in deployment.

The technique of employing tanks in close support of infantry differed considerably in various units. These methods can best be described by giving their actual experiences.

Elements of one division attacked and captured a certain hill with very few casualties,

using the method described below. Four previous attacks had failed.

A company of tanks was attached to each assaulting infantry battalion. In addition to their normal equipment, tanks carried nine sets of prepared demolition charges for use in breaching hedges, and one telephone instrument mounted on rear of tank and connected to interphone circuit in order to provide voice communication between infantry and tank commanders.

The leading tank of each close support column operated as a member of a team consisting of the tank itself, one rifle squad, and one engineer demolition detachment of four men. The engineer detachment accompanied the tank throughout the operation to assist its advance by breaching hedges with demolition charges and to provide a measure of local protection against AT grenades and rocket launchers. The infantry squad did not limit its rate of advance to that of the tank, but continued the attack when the tank was stopped or delayed for any reason.

Elements of the team moved from one hedgerow to the next, usually in the following sequence: infantry scouts, covered by the fire of the other infantry and tanks; the infantry automatic weapons; the remainder of the infantry squad, accompanied by two engineers who selected a firing position at the new hedge for the tank and signaled it forward. The new tank position was selected near, but not in, an existing gap, or at a planned gap which afforded observation and a field of fire and also facilitated further movement forward. The tank, accompanied by the two remaining engineers, was the last element to move forward.

A recent report of a corps in France describes a successful action on 1 July 1944 involving excellent coordination of infantry, tanks, and artillery.

The tank battalion commander received the alert order for the attack shortly after 1300, 30 June. He immediately initiated route reconnaissance to the area of the impending attack. By about 1400 he and certain members of his staff were at the headquarters of the infantry battalion to confer with that

battalion commander, his staff, and company commanders. Plans were coordinated and the orders issued at this time. The orders provided:

a. H-hour was 0930, 1 July.

b. One company of six tanks would support each of the two infantry assault companies and one would be in general support.

c. Artillery preparation would precede the jump-off, and when this preparation lifted, the mortars would fire from positions in rear of the line of departure at suspected AT positions.

d. All tanks would be held well in rear of the line of departure and the direct support tank units would move forward to cross it with the infantry at H-hour.

e. The infantry battalion commander would be furnished a tank radio to permit continuous contact with the tank commander.

The attack began on time. The tanks moved forward slowly on both sides of hedges paralleling the direction of advance, avoiding roads. As they advanced, they sprayed the hedges with machine-gun fire. Tanks, mortars, and artillery shelled crossroads and other suspected AT gun locations. Artillery forward observers accompanied the leading wave of tanks.

The infantry kept abreast of the tanks and protected them from hostile infantry armed with antitank grenades or rifles. The infantry also mopped up and, in the absence of other targets, fired at the most likely enemy cover in sight. When antitank guns were encountered, infantry mortar and automatic fire was brought to bear on them in addition to the shelling, and the infantry moved in to outflank the positions.

The supporting tank company and the infantry reserve company advanced slowly behind the leading wave, mopping up bypassed resistance and prepared to meet counter-attack.

This attack gained 2,000 yards against determined resistance, well organized with open and concrete emplacements. The objective was seized at 1500 and secured at 1600.

The following points are credited by the corps with the success of the operation:

a. Timely consultation and careful coordination.

b. Ample time for the tanks to make daylight preparations.

c. Tanks were held well behind the line of departure until H-hour.

d. Quick mutual support was insured by continual liaison and close proximity of infantry and tank elements and artillery forward observers. Each did the job for which it was best suited.

The experiences of many other units lead to similar conclusions. They emphasize the relative ineffectiveness of German small-arms

fire against a moving target and the great effectiveness of his artillery and mortar fire against a stationary target. The principal danger from the German sniper appears to be that of permitting his fire to hold a group stationary long enough for mortars or artillery to be placed upon them. Many units have adopted the practice of detailing certain individuals to deal with snipers and of requiring all others to continue to advance, regardless of sniper fire. They stress the need for the closest possible coordination between tanks and infantry, and the supporting engineers, artillery, and 4.2 mortars. Above all, however, they stress the absolute necessity for aggressiveness on the part of every member of the team.

Flame-Throwing Tanks on Saipan

From an article in *Army and Navy Register*.

MARINES on Saipan, Marianas Islands, combined two old weapons to produce a spectacular new one with devastating effect. It is the flame-throwing tank. Under the type of fighting which took place there, with the Japanese soldiers well entrenched in mountain caves and cliffside dugouts, it was a Godsend to our infantry.

One tank was credited with killing seventy-five Japanese soldiers in a cave. Many such dugouts were virtual arsenals and practically unapproachable by the infantry.

The tanks also were widely used in advances through sugar cane fields, where Japanese snipers frequently hid. One burst of a tank flame thrower burns a large section of field. Abandoned houses in which the Japanese frequently concealed machine guns were burned while our infantry remained a comparatively safe distance behind. Even wells which could have harbored a sniper or two were given a brief singeing for good measure.

In one engagement these tanks escorted

Marines through a palm grove in which the enemy had constructed an intricate system of dugouts, foxholes, and tunnels. The damage they did in "burning out" many of these tunnels was instrumental in getting our troops into the grove.

In the same engagement, flame-throwing tanks were used to cover the advance of demolitions men, who blew up a pillbox in one sector. In this case it is doubtful if an infantry-borne thrower could have been brought close enough to the fortification to be of use. The tank not only has good maneuverability, but is armored.

Against this weapon, the Japanese were able to offer little resistance. Cannon-bearing tanks frequently covered the flame-throwing tanks when advancing against fortifications to knock out antitank guns. Their destructive power was immediate and intense. In the slow hill-to-hill, cave-to-cave fighting which characterized so much of the battle on Saipan, the flame-throwing tank was one of the most formidable weapons the Japs encountered.

Tactical Reconnaissance in the Fifth Army

MAJOR JAMES H. QUELLO, *Infantry*
G-2 Section, Seventh Army

The author reported to the newly activated Ninth Division in September 1940, and commanded a rifle and heavy weapons company in the 47th Infantry. In the Tunisian campaign he served as Headquarters Commandant, Ninth Division; in the Sicilian campaign he was attached to G-2 Section, Seventh Army; and in the Italian campaign he was assigned to G-2 Section, Fifth Army, as G-2 Air Officer. He has recently been transferred to the Seventh Army, where he is aerial reconnaissance coordinator in the G-2 Section.—THE EDITOR.

TACTICAL aerial reconnaissance in the Italian campaign was handled in a somewhat different manner from that prescribed in current manuals or circulars. It is believed that the system used was effective and may be interesting to army, corps, and division staffs.

All tactical reconnaissance for Fifth Army was centrally coordinated by the Fifth Army G-2 Section. Army requested an allotment of missions from the Tactical Air Command, who retained operational control of the squadrons. The number of missions made available varied with the army frontage, the number of corps and divisions, the Tac/R [tactical reconnaissance] requirements of the air force, and the situation. Two squadrons, one British and one American, worked in support of Fifth Army from September 1943 through April 1944. In May 1944 a French squadron was added.

All army requests for visual reconnaissance, photo reconnaissance, artillery reconnaissance, and naval gunfire spotting were submitted by the corps of the army to the G-2 air officer. He coordinated and combined missions, allotted priorities, and then transmitted the missions direct to the various squadrons by phone or via teletype. The missions were also called to the Tactical Air Command which reviewed the missions and issued a written directive to the squadrons authorizing

missions to be flown. This system had the advantage of close liaison and direct interchange of information between army and the Tac/R squadrons. Normally, the corps and divisions were too far away for satisfactory communications with the squadrons, and the daily queries from corps regarding observation, photo, and artillery results, as well as spot visual and photo requests, were consequently all funneled through the G-2 office which usually had ready communication facilities to both the squadrons and corps.

Keeping army missions under centralized control of army G-2 had the advantages listed below:

1. The many sources of information available to army G-2 from PRU [photographic reconnaissance unit], prisoners of war, civilians, radio intercept, special surveys, etc., could be coordinated with Tac/R to avoid repetition of effort or checked by Tac/R for confirmation or denial. For example, the G-2 air officer controlling Tac/R was in close contact with PRU, which was attached to G-2. Tac/R photo requests were checked against PRU coverage for the day, thus preventing repetition of photo missions from corps or divisions. A large supply dump or military installation reported by a prisoner of war or civilian could be confirmed by visual or photo reconnaissance. Also the expected movement of a unit through radio intercept information could be immediately checked by Tac/R.

2. It avoided conflicting requests being submitted to the Tac/R squadrons or Air Command by the corps. Army headquarters, with access to the complete army situation, was in the best position to allot missions priorities to corps. It provided a central agency at army to apportion the artillery adjustment missions to visual and photo missions according to the army situation.

3. The army G-2 air officer, a graduate of an American air observer's course and the British RAF air liaison school, was able to

control demands made by other army units considering the capabilities and limitations of Tac/R squadrons.

4. It enabled tactical reconnaissance missions to be closely coordinated with fighter-bombers, armed reconnaissance, and other air efforts of the Tactical Air Command which occupied a command post adjacent to army.

5. The intelligence and air liaison officers of the Tac/R squadrons and the army G-2 air had complete interchange of ground and air information.

6. It provided flexibility in tactical and artillery reconnaissance in the army. For some time Fifth Army operated on a wide front with five corps which required visual reconnaissance and artillery reconnaissance support. Pooling all missions under Fifth Army enabled Tac/R to be used in the most economical and effective manner in support of the army effort as a whole.

This system keeps to a minimum the channels between the ground unit requesting the mission and the reconnaissance squadron performing it, thus obtaining quicker results. The method used in Fifth Army is believed to be more direct and probably more effective than the system proposed in the War Department Circular, "The Mission and Employment of Reconnaissance Aviation." This circular states: "Requests for information originating with the Ground Force at corps or lower units are transmitted by the nearest Ground Liaison Officer to Army Headquarters, where they are filtered in the Army Air Section and then transmitted to the Tactical Air Command and the Tactical Control Center." From the Tactical Air Command the missions are apparently submitted to the reconnaissance group which, in turn, assigns missions to their Tac/R squadrons. Compared with the direct method employed in Italy, this system seems unduly cumbersome.

COMMUNICATIONS

The communications system was very complete. Army had direct teletype or phone to the squadrons through which it passed spot mission requests from corps to the squadrons

and also kept the squadrons posted on the ground situation throughout the day. The squadron in turn transmitted results of Tac/R, artillery adjustment, and naval adjustment missions to army over the teletype. Each squadron had a 299 or 188 radio over which reconnaissance results and spot photo interpretation reports were broadcast. The reconnaissance reports were broadcast immediately after the pilot was interrogated. Corps, divisions, or any other unit could receive reports by monitoring the Tac/R frequency. There was also a radio link between each Tac/R squadron and the Army Air Support Control. Mission requests from army G-2 could be transmitted and results received over the radio in case of a breakdown in wire communications.

In addition, G-2 obtained a VHF radio for monitoring observation reports of pilots in the air. It was also used to monitor artillery adjustment missions. Prompt reports were received of motor movements and targets reported by Tac/R and fighter-bomber planes. In an emergency the pilot in the air could be called from the army G-2 section and requested to reconnoiter a specific area. This was done a number of times during the May offensive. Reports received at army from the plane were promptly called to the corps.

AIR LIAISON OFFICERS

Air liaison officers played an important role in results obtained by Tac/R. Their duties were:

1. To interpret army intentions to the squadron, and to interpret for the army the air force side of any question.
2. Keep the squadron informed of the ground situation.
3. Brief pilots for missions.
4. Interrogate pilots after landing to obtain maximum accurate information from the pilot.
5. Insure prompt dispatch of information and photos to the ground commander.
6. Check the establishment of communication between army and the squadron.
7. Instruction and training of pilots in

Army Ground Force subjects. The British squadron air liaison section consisted of a major, two captains, and necessary clerks and administrative equipment. One captain was an artillery officer who briefed pilots for artillery adjustment missions. The operations of the entire squadron were greatly influenced by this section as they briefed and interrogated pilots for all missions and performed all intelligence and operational duties. The squadron commander decided policy and all matters pertaining to how the mission should be flown. The French squadron air liaison section consisted of a major and a lieutenant who performed similar functions. In the American squadron, the air liaison section consisted initially of a major and a captain who worked with the squadron intelligence officer in maintaining the situation and flak maps, briefing and interrogating pilots, and other duties. The captain was a combat-experienced artillery officer and was instrumental in developing artillery adjustment by fighter type planes in the Fifth Army artillery units. Artillery adjustment missions were highly successful after initial difficulties in communications and procedure were corrected. The air liaison officers of the squadrons contacted army, corps, and brigade artillery officers and made all necessary arrangements for artillery shoots.

ENEMY MOVEMENTS

The Germans showed a judicious respect for our air power and made all their major movements at night except when forced out of their position. During stabilized situations, only well spaced traffic was reported during the day.

In the month of May when the sudden breakthrough of the Gustav and Hitler Lines forced large enemy movements during the day, the air force claimed that the enemy lost 2,329 vehicles destroyed and 1,873 damaged by strafing and bombing. Many of the air claims were verified by actual count from the ground. Profitable targets located by Tac/R were called to the local air controller who would, in turn, call the information to the fighter-bombers in the area. The controller

arranged an immediate rendezvous over a prominent landmark and the Tac/R planes would lead the fighter-bombers to the target. This system proved effective.

LIMITATIONS AND CAPABILITIES

The aircraft performing tactical reconnaissance are the P-51 and Spitfire. These aircraft operated in pairs; the lead pilot observed ground activity and his "wing man" provided him protection against surprise attack by enemy aircraft. Because of the vulnerability to flak, the reconnaissance flights were made at altitudes from 3,000 to 10,000 feet, and usually about 6,500 feet. Even with their great speed, reconnaissance flights at lower altitudes may decrease the operational life of the plane to an impractical point. Also, the picture unfolds too rapidly at lower altitudes for thorough observation reports. Thus, Tac/R is often unable to obtain detailed information by visual reconnaissance. It will rarely locate vehicles parked near trees, properly camouflaged gun positions, or deployed troops. Expectations of visual Tac/R must be limited to information of enemy movements of vehicles or trains over lines of communication to the enemy rear, or to blocks on the roads, blown bridges, and gun firing. The only practical way of obtaining detailed information of enemy gun positions, parked vehicles, and defensive installations on a corps front is by photographic coverage provided by PRU aircraft. Tac/R planes equipped with vertical cameras are best utilized to obtain photos of small important areas when high or medium clouds prevent the high altitude PRU coverage. Vertical Tac/R photos are suitable for pinpoint photos of bridges, road blocks, etc., and for supplementing pilots' visual reconnaissance of a suspected area. The length of the photo run Tac/R is capable of taking will depend on the focal length of the camera and the flak situation. A few Tac/R planes are also equipped to take oblique photographs. The purpose to which the oblique photographs are to be put should be considered when requesting this type of coverage and should be explained in the request, as the tilt of the

camera may be varied somewhat to meet different requirements. Air liaison officers are capable of making necessary calculations to determine the height, focal length, speed, and intervalometer setting to obtain a desired scale and required overlap.

Each Tac/R squadron had a photo interpreter who accomplished first phase photo interpretation and broadcast the results over

the Tac/R net or called results into Tactical Air Command or army.

Staff officers trained at air liaison schools should be acquainted with the limitations and capabilities of aerial reconnaissance. This knowledge will assist in planning, eliminate misunderstandings, promote the maximum air-ground cooperation, and produce the most effective results.

Barrage Balloons in Italy

An article in *Army Ordnance* July-August 1944.

BARRAGE-BALLOON operations have played an effective part in invasion tactics and have helped screen all ports occupied by American troops in Italy. In a report to Major General Joseph A. Green, Commanding General of the Antiaircraft Command, Lieutenant General Mark W. Clark, Commanding General of the Fifth Army, said: "Very-low-altitude balloons were used over both British and United States beaches in Fifth Army landings and have been used over all ports subsequently occupied. They have also been used in protecting critical defiles."

Very-low-altitude balloons are about thirty-five feet long and look like fat fish with large tails. They are easily handled. In one instance, an officer and six men won Silver Star medals for running up and down an Italian beach with a balloon after several others had been destroyed when left stationary. The balloons support metal cables which deny important airspace to hostile planes. When a number of balloons are "sited" according to a plan and are operating to defend a particular area, the barrier presented by the cables is called a balloon barrage. The barrier's mission is similar to that of antiaircraft artillery—to provide local day and night protection for ground establishments and ground troops against aerial attack.

One report from Italy states that from the start of one operation, "antiaircraft artillery, including very-low-altitude barrage balloons, caused enemy aircraft to take evasive action or fly immediately outside or above effective automatic-weapons range, thus neutralizing enemy air missions within the defended area." This report points up another purpose of the barrage. Planes flying low are often damaged or harassed by automatic weapons of the caliber .50 machine-gun and "pom-pom" types, but they are too close for effective use of larger antiaircraft weapons like the 3-inch and 90-mm guns. By forcing the planes to fly higher, the balloons permit these larger-caliber guns to be brought into play. At these higher altitudes, friendly pursuit aviation also may be sent against the attackers.

The value of the barrage was mentioned in a report to the Fifth Army commander by the commanding general of an antiaircraft artillery brigade of the army: "I believe that the presence of balloons on the beach on D-day and the following days was a most important factor in preventing hostile aircraft from flying low over the beaches. I also believe that barrage balloons are a vital element of the defense of a vulnerable area, such as a port or landing beach."

Information and Education Division

MAJOR GENERAL F. H. OSBORN

Information and Education Division, Army Service Forces, War Department

IT is quite seldom that you see a General Officer in the American Army really mad, but I have seen just such a thing myself—and he was very angry. He was angry about something that had happened a whole month before, and he was still angry about it. This officer was a very “fighting” General with a “fighting” record, but he was overage for overseas duty—a Lieutenant General with a heavy responsibility in this country.

In the early days when our troops were first encountering the enemy, he had gone overseas to see them in action. He had gone up on the side of a hill where there was a battalion and had gone to the battalion commander and said to him, “What are your orders?” The battalion commander said, “Sir, our orders are to take this hill.” The General said, “How long have you been dug in here on the side of the hill?” The battalion commander said, “About twelve hours. They began to shell us so we dug in.” The General said, “Where are the Germans?” The battalion commander said, “I don’t know.” The General said, “When are you going to attack them?” The battalion commander said, “We are waiting for further orders. The men don’t like to attack until they find out where the Germans are.” When I saw the General a month later he was still mad as hell, for he had seen an officer and troops who had no sense of urgency, no appreciation of the importance of their mission.

Another story illustrates a related condition. I was on the north coast of New Guinea not so very long ago. There were a lot of boats there and a large number of troops were helping unload them. I noticed two boys who were particularly active. I asked them how long they had been there. They said, “Two or three months.” I asked them if they liked it. They said, “This is really great. We have been training for two years and now we are really doing something. With these supplies we will mop up on the Japs. We like it.”

There was another fellow who was taking a small part in the unloading. He wasn’t unloading a tenth of what the other fellows were doing. I had a little chat with him. He said he did not know why he was there and that New Guinea was a terribly long way from the state he came from. He had no sense of personal participation at all and he didn’t feel he was any part of it.

The points of these two stories are the same. Whether the soldier is going into combat or whether he is in the rear area unloading supplies, he is not going to do half the job he can do unless he has a keen sense of the importance of this war; a keen sense of the importance of the job in the particular theater where he is; and over and beyond that, a sense of the personal part he is playing in this big show.

Getting men to do their best by giving them an understanding of their particular jobs is a task of leadership. To assist officers in this leadership responsibility is a function of the Information and Education Division. Unfortunately, every company officer and every platoon leader is not a natural born leader of men with the necessary quality of inspiration. Many of them need instruction in leadership.

Besides, there is something more to this job than just leadership by the officer. In order that a soldier understand what is going on—and his part in it—it is necessary that a substantial part of that picture come to him through the media which are his normal sources of information. In this country, he has been accustomed to press, radio, and educational facilities. Overseas, those information media would be cut out of his life were it not for special operations undertaken by the Army through its Information and Education Division. Until the Army started its own radio operation, about the only radio news troops received in the Pacific was from Tokyo. Newspapers were received infrequently and long out-of-date—and they were

of Australian or British origin, a style to which Americans were unaccustomed.

So Information and Education Division went into the job of supplying information. We started with the magazine called *Yank*, with the purpose of supplying soldiers all over the world with a global weekly Army paper about this global war, so that the soldier in the Southwest Pacific would know something about what was going on in England, Italy, and Africa. *Yank* has grown until it is now published simultaneously in fourteen separate places overseas. It had a paid circulation last week of 1,560,000 copies. Since studies indicate there are about four readers per copy, that means nearly everyone in the Army, and particularly overseas, reads it, and from reading it gets a better picture of what American soldiers are doing all over the rest of the world. Besides *Yank*, there are more than 2,000 Army newspapers. Paid circulation of *Stars and Stripes* in England, the biggest of the Army newspapers, was 570,000 daily when I left there recently. It is sold only to troops. Now it is published in France as well as in England. There are all types of papers, from printed dailies down to the small mimeograph news sheets which most units get out every day. Nearly all of them depend on daily news communiqués which our Army News Service sends out from New York twice a day. These news bulletins are transmitted by the Signal Corps and in many cases they are sent up to the troops at the front with rations.

Another medium of information for American troops is the radio. As I said before, when our men first went overseas they heard no radio in the Pacific except Tokyo, and in North Africa none except Berlin. Now the Army is operating a global radio service. There are some 100 Army transmitting stations located at points throughout the world, and 300 other radio outlets in our system—government and commercial stations and public address installations. We have installed radio stations on islands in the Aleutians and in North Africa. We are now going on the air in Rome and South America. These stations are programmed by the Army.

Each week we fly out from Hollywood, 6,000 one-half hour transcriptions, a total of forty-two hours of radio programs and entertainment which are prepared or produced by the Army with the donated services of the top people in the entertainment world. Twenty-eight hours of the program material consists of regular domestic radio programs from which "commercials" have been removed, and fourteen hours is program produced solely for troop consumption. We put these transcriptions on the transports and fly them out to Army stations. Entertainment, of course, is the backbone of radio. It is what makes people listen, but the programs intermix news summaries, education, and orientation.

Another medium which all of you have seen is the newsmap gotten out from Washington. And there is a wide variety of booklets and posters.

But media alone aren't enough. The thing that makes the strongest impression on the men today is the same thing that has always made the strongest impression, the personal voice and leadership of the men with whom they are working and the man who is their commander. Even before Pearl Harbor, under General Marshall's instructions the Army set up what is called the Army Orientation Course. It is an hour each week during training time, in which the company officer talks to his men and has his men ask him questions, not about training matters, but about the causes and origins of the war, major objectives of the war, progress of the war, the news of the war, and the part which his unit is playing.

The orientation program has had its ups and downs. At first, civilian lecturers were used and they were not popular. We substituted a series of films on the origin of the war and its progress—the so-called "Why We Fight" series. They have been most successful. Gradually the Orientation Course has been getting acceptance; experience in combat showed the need for it.

Sometime ago I talked with two generals commanding divisions in the line at Bougainville. I asked whether they had had any

orientation and I was surprised to hear them say, "Yes, we have." Both of these divisions had been through heavy casualties; they had been sent back for rest, and for replacements for at least half of the division. The men were very low; they had been in combat a long time. The new men who were brought in were discouraged by what they heard from the others. In each case, the Commanding General of the division picked an orientation officer who had been an effective combat officer and one who had a strong feeling about getting the men to understand what it was all about. In each case during training and while they were being replaced they had from one to three hours orientation prepared by G-2 and the orientation officer and even after they went into combat they were continuing this orientation hour.

Now it is a very interesting thing that what actually happened out in the field was exactly General Marshall's conception of the job. It developed out in the field because it was needed, and so there began to be a re-awakening to the need for orientation. We began getting out additional material. We began sending a large number of orientation officers to school at Lexington. From perhaps ten percent of companies conducting an effective orientation hour some six months ago, that figure has increased to thirty or forty percent.

The contact of officers and men in the orientation hour is supplemented by all media of information; newspapers, film, radio, news-maps, guides. In all these media we try to keep three purposes in mind:

First, motivation. What we present should be so written as not only to add to the information of the man who is reading it but also to give him the motivation for action and for more effective work.

Second, explanation. There are lots of things in this Army that it is hard to understand and when men don't understand they don't do their work well. So we try to explain and try to bring up subjects which need explanation.

And finally, we try to reassure. All of us have worries. Those worries are intensified

among men who are overseas going into combat, so we try to reassure and carry out a proper explanation of what they are doing. We try to motivate, we try to explain, and we try to reassure. How do we know what to explain to the men? How do we know what men worry about?

Before we started doing any of these things I have been telling you about, we took over from G-2 a research group for the purpose of making studies of troops' attitudes and their anxieties. Their attitude towards their work, towards noncoms, towards officers, and towards the causes of the war.

These studies are made in this way. We have a research staff consisting of some twenty highly trained and highly specialized men. In this country, we have about fifteen or twenty civilians and a number of enlisted men of the same general type. We are doing research in this country and in all the major overseas theaters, using questionnaires to study troops' attitudes. The questions in the questionnaires are very carefully considered, and drafted by our research people. The questions are pre-tested to find out whether the question is understandable and whether it has meaning to it.

These surveys are conducted by enlisted men whom we have selected and trained. They advise the men: "You have at your desk a questionnaire which is part of a survey which the Army is making. It contains all sorts of questions. Answer them the best you can. I am going to take these back to Washington where they will be put on tabulating cards. The better you answer these questions the better the Army will do its job." We have had very successful results from these questionnaires and have received answers to all sorts of questions which have had an important bearing on problems of military leadership.

For example, our studies on men's attitudes towards their branch of the service have shown the necessity, in some cases, of orienting men to the importance of their branch in the war effort. Likewise, studies of attitudes towards job assignment have revealed the need of orientation on the impor-

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tance of particular jobs. We are told by combat officers that our studies on combat fear have furnished them with valuable information to aid them in dealing with that problem. As a result of studies on furlough and rotation policies, new regulations were issued.

In all, 150 distinct surveys have been conducted to date, involving 300,000 men. There is a wealth of evidence that these studies have developed a fund of facts which have aided military leadership in meeting a wide range of problems—matters such as fear of German weapons, attitudes of hospital patients, attitudes towards training and its effectiveness, attitudes towards the enemy, factors affecting the morale of infantrymen who have seen combat, the effectiveness of visual training aids, how men feel about food, laundry, clothing, etc.

Fact-finding has become a very significant part of Information and Education Division's operations. It not only aids our work and that of the general staff, but it gives invaluable information to those groups overseas who are directing orientation and education programs.

We have now in all of the major theaters separate staffs in charge of our work. They usually report directly or indirectly to the Commanding General of the theater.

I want to tell you about the job that was done in England in the six weeks before invasion. In the first place, we had very complete research on the attitudes of our troops in North Africa. Combat troops have been studied before they went into combat and immediately after they came out of combat, and so we had a pretty good idea of what should be known before they go into combat. A very able writer and combat officer, a Major, was assigned as an enlisted replacement for one month in three different units so he would get to know what the men were thinking about. They were all thinking about landing on the beachhead; half seriously, half humorously, they were all talking of getting killed. That was what they were thinking and talking about. That man then went to London and was made chief of orientation planning. A four-page memorandum

was prepared outlining what the soldier was thinking and talking about before the invasion. That memorandum was placed before General Eisenhower and he made some suggestions and changes. Then the memorandum was taken to the editor of *Stars and Stripes*, with a circulation of 570,000 a day, and he set up a publication called *Warweek*, and got it out every Thursday, four pages. The memorandum also served as a guide to the editors of *Yank*, with a weekly circulation equally as large as *Stars and Stripes*.

A little pamphlet called *Army Talks*, issued each week in the European Theater of Operations, was directed particularly at the immediate matters concerning soldiers prior to invasion, a series of five being prepared to cover the period prior to invasion. The first one was called "The Enemy and You" with a description of the enemy warfare and the English and German soldier. The second one, "These Guys Fought 'Em," contained firsthand accounts about the Germans from men who fought them in Tunisia and Sicily. The third was called "Mein Kampf" by Adolf Hitler. It dealt with Hitler on democracy, Hitler on education, Hitler on life, and Hitler on religion.

Just about this time General Eisenhower decided to place orientation in operation on a platoon level instead of company level, so that the groups would be smaller. He got out a personal letter to his five top commanders, telling them to see that this material coming out in *Army Talks* and *Stars and Stripes* was properly used.

The fourth issue was "How Russians Kill Germans." I wish I had space to include a page or two from that because the Russians have some very strong ideas on how to kill Germans.

Finally, came the fifth talk, "Achtung!! Atten'SHUN TO YOU!" When I read this, I knew the invasion was within the next few days because this was the final "pep" talk. Everybody on the staff had some part in getting out the material—why we were going over the Channel, and how, like the Russians, we were going to have to kill Germans. Gen-

eral Eisenhower liked it so well he ordered one given every soldier going over.

In the meantime, talks were held on Friday and Saturday, and on Thursday *War-week* came out. On Friday afternoon there was a radio talk given about the same subject in the style of "March of Time." One doesn't know how much effect it had on the morale of the men, but General Marshall said in his release to the press: "From every portion of the line where our men are fighting came reports of the aggressive action, skill, and high morale displayed by the American soldier. . . . This probably was the most reassuring aspect of the operations to us and the most depressing to the enemy."

There is one additional thing I would like to tell you about. To me it is a need which is over and above the need of information, motivation and reassurance. The soldier is, in many instances, a pretty ambitious guy. He wants to get along—and he is willing to work for his personal progress out of hours. Four years ago we started a correspondence course through the United States Armed Forces Institute. The Institute now has eight branches all over the world. There are 225,000 men taking correspondence courses and ninety percent take subjects which might assist advancement in the Army. For fellows who have ambition, it is a great morale factor.

In addition to that, there is a larger job behind the development of this educational program. Some day this war is going to peter out and when it does we are going to be faced with a tremendous morale problem. I went through it in the last war. Our troops suf-

fered a deterioration which was sickening to watch and which I think is one of the reasons for this war, because when these men were through with fighting and had gone through six months of deterioration they had no interest in the war and were sore with the Army. The post-hostilities educational program is set up to give the troops a chance to feel they are doing something useful while they are waiting to go home.

I have talked to you about orientation for combat, but there is much more to it than that. Some of the men who need orientation most are not combat troops, but those who are doing another job. When I think of the job we are going to have to do when combat ceases, then I think we are going to face our biggest orientation job. We are going to have to explain through the company officer why it is men can't go right home. We are going to have to remind them what the war was about, soften some of them about the indifference or lack of understanding of the home population. They will have a difficult readjustment with the folks back home. We must bring these men back this time with an understanding of what the war was about, determined that they will do their part to prevent another war. So this job of orientation will be equally important in the difficult days ahead—immediately after combat. It will be then as it is now, a command job, right down through company officers or platoon leaders to the men. The Army has a big stake in doing this job well. But to the country—our country—it is even more important.

Bulldozed

A bulldozer belonging to the Royal Engineers won a battle with a strongly-held German pillbox in Normandy without firing a single shot throughout the action. The pillbox was hotly engaged with a British infantry unit when the bulldozer came along. The

driver sneaked his machine out of the line of fire and, approaching at about half a mile an hour from one flank, banked up a hill of earth that blocked first the Germans' view and then their fire altogether. The waiting infantry did the rest. (From *Britain*, British Information Services.)

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Air Cooperation

MAJOR GILBERT E. ERB, *Air Corps*

Instructor, Command and General Staff School

JUST what is this principle of modern warfare known as "cooperation" that is so often emphasized? Webster gives us a start by defining the term formally as: "Cooperation—collective action for mutual profit or common benefit."

In the past we referred to air assisting the ground or naval forces as "air support"—until someone realized that "cooperation" is truly a better word, especially when we remember that the common definition of support is "to hold up or in position; also to sustain (a load)." Early combat lessons proved that air and ground must be used as a team. On a smoothly functioning team, how can the act of assisting be one-sided? Battle experience has taught that assistance (or "support" if you prefer) is mutual. The thought we will consider is that the air-ground team requires joint, enthusiastic cooperation to defeat the enemy in an efficacious manner. Your next logical question is, "Do we have air-ground cooperation?" Of course we have, and it is continually getting better; however, we still have a long way to go. Back in 1943 (1 October) the late Secretary of the Navy, Frank Knox, saw us well on our way to achieve it when on a tour of the Mediterranean war theater he praised the cooperation he found among the Allied ground, sea, and air forces. Then, just a short time ago, Lieutenant General Omar N. Bradley, Commander of the First Army, declared to the press that the teamwork of the air and ground forces in the present offensive is "way beyond what we dreamed was possible." After the invasion of Normandy, the Germans said planes of the United States Ninth Air Force kept constant cover over the American armored columns, hit enemy strongpoints, and by radio steadily warned the tanks what they were soon to meet.

Almost every day we read such headlines as: "135 German Tanks Knocked Out by Air," "Enemy Airdromes Seized by Ground," "Air Leads Armored Spearhead," and others

equally convincing. We have finally learned, the hard way, that air and ground commanders each profit greatly from the other's successes.

Let us consider one limiting case—tanks. From our War Department publication, *Lessons from the Tunisian Campaign*, we read:

"48. Air attack has been generally ineffective against armored vehicles. It has been reported that even dive-bombing has failed to cause much damage to medium tanks. Tanks when attacked in this manner should continue to move zig-zag fashion. Deployed tanks can furnish their own air protection in the armored division. Proper anti-aircraft weapons must be provided for headquarters and service personnel."

That was back in July of 1943. At that time we thought our armored forces required no air protection. The Russians at about the same time were teaching: "In fighting hostile tanks, aviation provides considerable aid to the ground troops. It is able to annihilate enemy tanks not only on the battlefield, but also in their places of concentration and during their movement to the rear when use of other anti-tank elements is not possible."

"Air attack can be especially successful when the enemy commits large masses of tanks, as they are now doing [July 1943] in the battles developing in the Orlov-Kursk and Belgorod areas."*

Why did this difference in opinion between Russian and American experts exist? We said: "Air can't hurt our tanks—they don't need air protection, and our air power is not effective against the enemy tanks." The Russians said: "Air, here is a juicy target. Go get 'em! Our tanks require air protection; so keep the enemy air strength away!"

Could this difference in basic concept be attributed to these factors?

* Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel N. Shaurov, Red Army, in *Krasnaya Zvezda*, 8 July 1943.

1. The Russians had been in this war longer than we and had taken advantage of additional combat experience.

2. They had developed new and more effective tactics and weapons, and better means of employing these tools of war.

3. They had learned more about something basic, yet extremely essential to cooperation—*coordination*.

Yes, coordination is probably the factor in making cooperation truly effective. We were well on our way to achieving some semblance of cooperation, but the necessary timing in the application of our joint and combined forces and our arms and services still had great need of improvement. This "finesse" could only come through battle experience and the joint training and rehearsals our forces undergo today. We had to introduce the old "one-two punch" into our war tactics.

The lessons of Sicily, Salerno, Anzio, and the rest of Italy were required to bring home the fact that not only did we require mutual planned effort in our forces, but the operations had to be coordinated to perfection. We had to exploit and harmonize to the fullest the great capabilities of speed, maneuverability, and firepower of our arms—not individually, but collectively, for maximum advantage.

Now you say, "Well, how is all this coordination attained? Why all the fuss? We know it is required; just put our forces together and let them coordinate and cooperate." Such a simple solution may seem satisfactory, but it is not.

Let us start with a consideration of the mission of a tactical air force and a few words on the doctrine of employment and command of the air force, as developed from combat experience in the present conflict.

One should first realize how effective the air forces attacking vertically and the ground forces laterally *could be* in gaining their common objectives—that is, if there is the desired and required close teamwork in their common effort.

Experience early in the war taught us that by parceling out our air force to "support"

lower commands of the ground forces we had cooperation, but that we sacrificed the most valuable characteristic of air power, namely, flexibility—the ability to concentrate quickly a mass of aviation in a coordinated attack against any particular strongpoint, and when it is reduced, to shift it quickly to another. The experience of the Italians clearly illustrates this point. In 1940 the Italians in Africa violated this principle of flexibility by not adopting a system of centralized control. They parceled out their aviation to ground units; therefore, the efforts of their air force were dissipated. Their parity and even superiority in the air was lost piecemeal; soon they lost the initiative, which no doubt contributed to the final Allied successes in North Africa. The Italians had air-ground cooperation, but it lacked the coordination and flexibility for mass, timed attacks.

Centralized and coordinated control is necessary in reconnaissance aviation as well as combat. The missions of reconnaissance aviation necessitate a close relationship with our fighter activities and are directly influenced by enemy air action. The attachment of reconnaissance units to corps and smaller ground force units would deprive those units of essential operating information and fighter protection which is available only to the air commander. Then, too, a corps making the main effort may be limited in the amount of reconnaissance aviation available while another corps at that time may have more than required for its immediate needs. Flexibility is lost. For these reasons, theater air forces are kept under the command of the air commander, the same as the ground forces are under the ground commander, and both are under the command of the theater commander.

Now, how does air work? Will we bomb and strafe any targets of opportunity indiscriminately before our ground forces? No, of course not! There are other considerations. We have a plan of employment for our tactical air force consisting of three phases of operation in a definite priority.

For us to control the conditions—time and place—of battle in the air or on the ground

we must first gain and then maintain air superiority. It has been learned from experience that land forces operating without air superiority must take such extensive security measures against hostile air attack that their mobility and ability to defeat the enemy land forces are greatly reduced. The gaining of air superiority is, therefore, the first requirement for the success of any major land operation. Reports from the European theater tell us that no ground force can decisively advance without air superiority in that area. In fact, those are General Eisenhower's words. General Montgomery, another ground officer, has said, "If you do not win the air battle first, you will probably lose the land battle."

Only by the total destruction of the enemy air forces can we expect to have complete air supremacy. However, this is generally impossible since the enemy normally has the ability—just as we have—to concentrate his air strength, utilizing the advantage of surprise, and to gain local air superiority in some small area on our front. These hit-and-run tactics are best met by our counter-air force operations and the establishment of a fighter defense, including radio direction finder, ground control interception, and other types of equipment essential for the detection of enemy aircraft and the control of our own.

After this, the next logical step to help the ground is to isolate the battlefield by cutting lines of communications, destroying supply dumps and columns, and hindering reserves. We all saw this carried out in Italy and in Normandy. During our approach to Rome, dazed prisoners complained bitterly of walking up to a hundred miles over well strafed and bombed roads. The enemy's use of vehicles was out of the question, while traffic backed up in rail yards provided us with excellent targets. In Normandy, the whole area was isolated by the elimination of bridges over the Seine and the continual bombing and strafing of roads, marshalling yards, defiles, and any other possible targets. This permitted the regrouping of and the further effective exploitation by our invasion forces.

Then finally, air participates directly in the combined air-ground effort to destroy selected objectives on the front of the ground. In order to obtain the necessary close teamwork, the command post headquarters of the tactical air force and of the ground force concerned should be adjacent or common, as should the tactical air command and army command post, especially during the operation phase. General Montgomery, a strong advocate of close air-ground integration, has told us so well and so often that we must work together, or we all lose.*

The expression, "Where in the hell is our air support?" has been used many times by our ground combat personnel. Their anxiety is appreciated by the writer, but their usual further remarks are probably not justified when we actually go into the facts of how the air was employed.

Let us weigh carefully the three priority missions of the tactical air force and the reasons for each.

First priority—to gain and maintain the necessary degree of air superiority. The ground man should remember that an enemy plane destroyed in the air or on the ground, or even in the production lines, can never attack our troops. Cooperation is far-reaching, whether enemy planes, tanks, and equipment, or their component parts, are destroyed by our Air Defense Command, Tactical Air Force, or Strategic Air Force.

Until we gain the required air supremacy our ground forces cannot decisively advance, because they have lost their freedom of action and their lines of communication are in danger of severance. An orderly withdrawal or organized defense is likewise difficult. Therefore, it is often necessary to put the ground forces more on their own during this early phase of any air or ground battle. Without our air superiority the initiative passes to the enemy, and he can interfere with both our air and ground operations.

Second priority—to isolate the battlefield. An army cannot long exist without reinforce-

* The author urges you to see the reprint from the *Royal Air Force Quarterly* in the *MILITARY REVIEW*, June 1944, "Army-Air Integration."

ment of personnel and supplies. In Normandy, the enemy was denied resupply of ammunition, food, reinforcement of weapons, and personnel to use those weapons, and, as a result, was forced to retire upon pressure from our ground forces. Air augmented the pressure to a breakthrough magnitude. Further exploitation by well-timed air and ground action then turned his withdrawal into a rout, which is a further logical time for the final and third priority use of air.

Third priority—close air-ground cooperation missions. Here is the direct assistance of air to ground as distinguished from the indirect pointed out in priority phases one and two. Air has gained air superiority, has isolated the battlefield, and now can assist by hitting targets on the immediate front.

Is it possible to illustrate all three priority phases by citing actual cases? Here is one of the main examples we have today.

Recall how on 8 August 1944 the Germans launched a major counterattack east of Avranches (see Figure 1). The large-scale mechanized operation was cleverly planned to split the Allied forces on the continent and to block the supply corridor for the American First Army. Although the four enemy tank divisions had the advantage of weight and firepower and the plan was boldly executed, it lacked a single requisite of success—adequate air cover.

Over a long period of time, through cumulative action, we had whittled the German Air Force down to the size we desired prior to the invasion. The assault of the enemy, after gaining only three of the required twenty miles, ran into our prepared team—artillery, infantry, and air, each doing its

part with clock-like precision. The Nazis lost nearly 200 tanks, most of them to aerial gunnery.

Prior to and concurrently with the battle of Normandy, our combined air forces were isolating the battlefield. Intelligence and prisoner-of-war reports tell us that enemy reinforcements required a longer period of

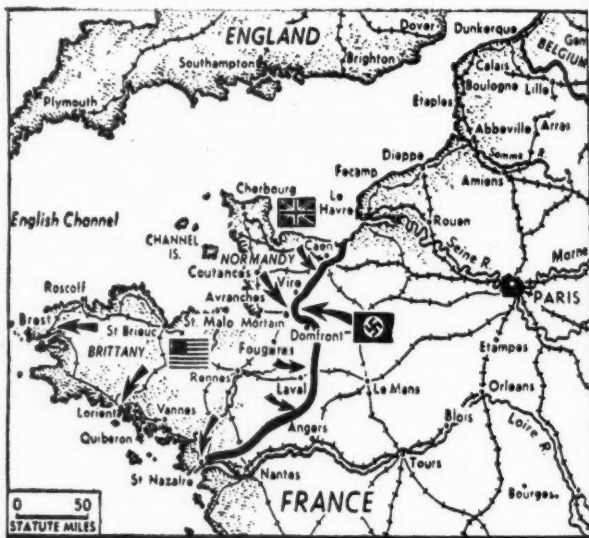


FIGURE 1.

GERMAN SEVENTH ARMY MAKES MAJOR THRUST. 8 AUGUST 1944.

time to move from Paris to the front than it had taken them to travel from the Russian front to Paris. Allied air knocked out bridges, railroads, and highways. Tank and vehicle columns were scattered and reduced. Enemy troops proceeded to the front on foot and as a result were in no physical or mental condition to fight. The enemy was short of food and matériel. "The German Army in Normandy is in a critical state and is slowly strangling for want of supplies," the Commander of the U. S. Ninth Air Force declared on 8 August 1944.

As it happened, planes were available for close air-ground cooperation missions and were used when weather permitted. Even if

not one airplane had been seen by our ground forces, they should have been indoctrinated with the true facts—air-ground cooperation was proceeding according to plan. Priority phases of air operation (one and two) were being carried out successfully. The indirect help to ground cannot be overemphasized

We say the battle role of the infantry is close combat—to close with the enemy and destroy him. To do this the infantry division uses fire to weaken and anesthetize the enemy, movement to close with the enemy, and shock action to destroy him. Here, as time after time in our campaigns in France, the best

troops of the Wehrmacht were reported to be groggy from the bombing and strafing to which they had been subjected. With the enemy in this condition, even maneuvering planes forced some of the enemy to surrender. One pilot "rode herd" on more than two hundred Nazis who had surrendered to the flying aircraft. No, the writer does not mean to insult your intelligence by insinuating the great versatility of air permits it to assume the battle role of the infantry. On the other hand, when the conditions are right, air can certainly run interference for the other arms, and through teamwork we can really carry the ball.

The end of this battle in Normandy was, of course, much as we had planned it. Although the remnants of some enemy Seventh Army divisions did escape, they permanently lost the initiative

and will never be able to replace the thousands of troops and hundreds of tanks and vehicles left on the battlefield. From now on, more than ever, the enemy will be fighting defensive battles. It must be remembered, without air superiority which we must never let him regain, even a defensive war is going to be costly. Reports that German air personnel are now fighting as ground troops is further vindication of our air strategy. The gaining and maintaining of air superiority is probably the biggest factor

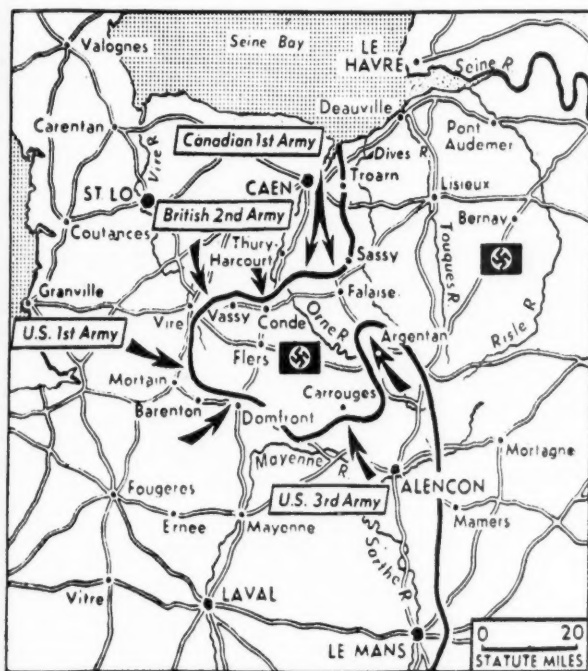


FIGURE 2.

ALLIED ARTILLERY AND AIRCRAFT ADMINISTER THE "ONE-TWO PUNCH."
15 AUGUST 1944.

Nevertheless, let's not stop here, for at this point air and ground really go to work—we exploit the initial successes of both air and ground. This is the time when the first two priorities of air have been accomplished; the home team can make the touchdown. Flanking Allied drives pocketed the bulk of Hitler's Seventh Army. Close air-ground cooperation and ground exploitation resulted in the situation shown in Figure 2, by 15 August 1944. The enemy's only escape gap was plugged by the artillery-air team.

in opening the enemy's front line. Then we can follow with a general work-over of his lines of communication, and finally devote our attention to his front-line troops resulting in the successive "touchdowns" which will bring final victory over both the Nazi and the Jap.

In conclusion, this final thought must be remembered. It stands to reason that the ground forces and the air forces, each having their respective specialized personnel and equipment, but nevertheless having a common mission calling for close teamwork, should stand on an equal footing, but be dependent

upon each other. Neither is an auxiliary of the other. They must be co-equal in planning; but the final plan must be a combined, well-balanced, workable plan. The execution of the plan requires the coordinated cooperation found in any championship team.

Then, finally, with air and ground each having a complete understanding of the other's capabilities, limitations, and problems which can and do arise, we will roll on with mutual confidence and trust as a single team—to defeat the enemy much more quickly.

Naval Cooperation

Digested at the Command and General Staff School from an article in
The Fighting Forces (Great Britain) August 1944.

ALL that one hears about the naval bombardment in support of the Normandy landing testifies to its remarkable efficiency and to the important influence it has had.

When one recollects the somewhat unreliable reputation with which naval artillery support of shore operations emerged from the Gallipoli campaign, it is clear that a very substantial advance has been made between 1915 and 1944. The key to this progress lies in the way that the three services have really got their heads together in recent years with the determination to flog out a system that would allow the very powerful gunpower of the fleet to be brought to bear in combined operations with the maximum possible effect.

The basis of the system evolved is close cooperation obtained by the interchange of skilled personnel. Every bombarding ship has its own Army gunner officer, known as the BLO (Bombardment Liaison Officer), who lives on board and is always available to assist the captain and the ship's gunnery officer in meeting the requests for fire that come from the shore observation officers. These latter are known as the FOB's (Forward Officers for Bombardment). They are also Royal Artillery officers, and again there is one for each ship, who has with him an NCO and several naval telegraphists for passing back re-

quests for fire and subsequent spotting corrections in naval signaling language. There is thus a complete naval-military team for controlling naval bombardment fire, all of whom know each other and have trained together beforehand. The result of such a close integration is a mutual confidence that can be suitably illustrated by the case of the FOB who did not hesitate to spot a battleship's 15-inch fire to within 150 yards of his own observing position, so sure was he of the accuracy of the shooting and the control.

The engagement of targets beyond the range of observation of the FOB's is obtained by aircraft-spotting, and this too has made great strides. One of the problems here is that the rather slow spotting aircraft of pre-war conception has proved to be easy meat to the high-speed fighter. The only solution seemed to lie in an equally high-speed spotter, and this was for long thought to be impracticable from the spotting point of view—the spotting aircraft would flash by too quickly to see the fall of shot sufficiently accurately. Careful training, however, as in most things, enabled this difficulty to be overcome, and some excellent results are understood to have been obtained, particularly against heavy shore batteries some way within German occupied territory.

Operational Planning for Jungle Operations After an Amphibious Landing

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This article is a sequel to "Planning Phase of Amphibious Operations as a Prelude to Jungle Operations" which appeared in the last issue of the MILITARY REVIEW. Each article is complete within itself, as the amphibious phase and landing operation must be completed and a period of reorganization allowed before the jungle operation can be undertaken.
—THE EDITOR.

SINCE the entry of the United States into the war in December 1941, virtually every operation conducted by the United Nations in the South and Southwest Pacific has involved a combination of amphibious and jungle operations. Guadalcanal, New Guinea, the Upper Solomons, and New Britain have developed the pattern for such operations.

Once the assault forces have landed, these operations resolve themselves into jungle warfare, since the terrain inland from the beach is heavy tropical jungle growth interspersed with swamps and mountains.

Jungle warfare is a combination of many varied types of warfare, each once considered as a "special operation," and includes fighting in the densest of woods, in mountains, under extreme weather conditions, at night, and in river crossings.

The deadly dangers of the jungle do not exist for the trained jungle soldier. There are more casualties in a week in the United States from automobile accidents than there will be within many years from tropical snakes, alligators, vampire bats, big cats, and other jungle animals.

However, the jungle soldier must be physically fit and must acquire endurance to move and fight successfully. He must be a self-contained, independent fighting unit, able to cut his way through jungle from dawn to dark for many days while carrying his arms, ammunition, food, medicine, and sleeping equipment—and come out fighting. Experience has

proved that only young men have the required stamina for these conditions.

Individual training to live in the jungle must include junglecraft, or the ability to see simple things and to know what those simple things mean—the ability to make the jungle a friend by converting jungle peculiarities to advantages instead of obstacles. A thorough knowledge of woodcraft, scouting and patrolling, sanitation, and march and camp discipline are important. It has been found unnecessary for troops to train for extended periods in the jungle; but it is essential that troops with normal training spend a period of some weeks in tactical bivouac in order that, through actual experience, the psychological fear of the jungle and its weird noises may be overcome and they may gain experience in such tricks as how to track a man, to see old machete marks in thick country, to cross swift streams, to find jungle food, and to see before they are seen—in short, to outwit the enemy.

Individuals must be "machete minded." The poorest jungle native treasures his machete. It is his means of livelihood, movement, and survival. Without a machete, some jungle may be impenetrable, but with a good machete to help, no jungle is impenetrable.

Jungle tactics are essentially those of a meeting engagement and envelopment. Contact comes suddenly and at short ranges. It is "column of file" warfare, but troops must not be trail-bound and must be trained to live and move off of trails. Simple, small-unit maneuvers are most successful; and individual initiative and small-unit leadership are the key to success. In making contact, leading elements fix the enemy, and troops in rear break off of the trail and try to turn the enemy or cut him off by envelopment. The fight is largely for defiles and lines of communication. Stabilization is virtually impos-

sible in thick jungle because troops must eventually return to trails.

Defenses are often along trails and in depth, with a series of well prepared blocking positions, ambushes, and frequent booby traps. All installations must have all-around protection at all times and aggressive patrol-

zers—and lightly equipped otherwise with special clothing, bedding, rations, etc. Heavier equipment will be needed later and can follow the advance forces. All jungle fighters, though, must learn to get along with what they can carry on their backs.

Supply is, possibly, the controlling factor

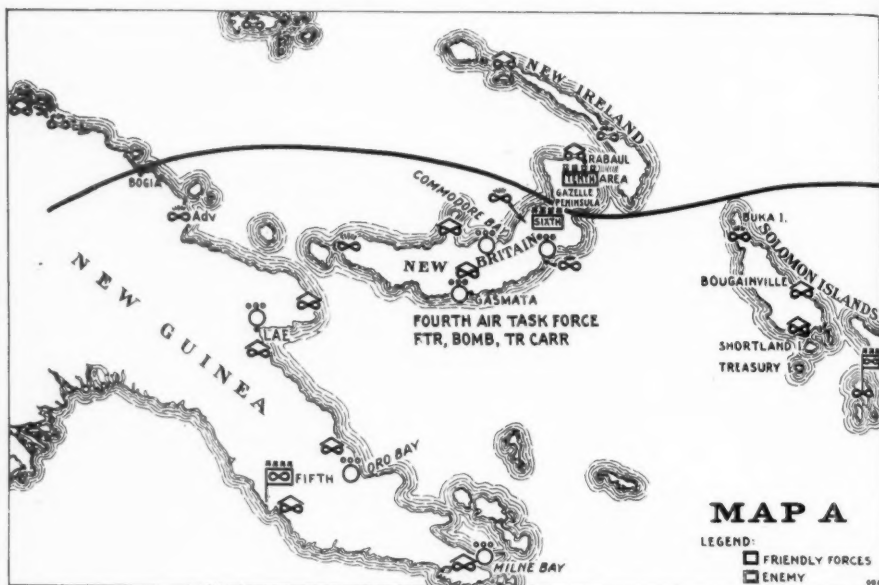


FIGURE 1.

ling must be carried on by night as well as by day, whether on the offensive or the defensive.

Surprise is the ultimate goal of all jungle tactics. The renowned Mexican raider, Emiliano Zapata, gave his fighters these excellent orders which are quite applicable to jungle warfare—"Never engage the enemy except from cover, ambush him, lure him into pursuit, exhaust him, cut back on him when he is exhausted, fade away. Do nothing that you are supposed to do; do everything that no one would dream that you'd do. Keep cover, shoot straight, and never let up."

Advance forces should be specially armed with light weapons—small arms, light machine guns, mortars, and 75-mm pack howit-

ers—and lightly equipped otherwise with special clothing, bedding, rations, etc. Heavier equipment will be needed later and can follow the advance forces. All jungle fighters, though, must learn to get along with what they can carry on their backs.

Let us consider an *assumed* situation involving a combined operation as a sequel to a shore-to-shore amphibious operation.

GENERAL SITUATION: Map A (Figure 1)

Allied South and Southwest Pacific forces, including ground, air, and naval elements, have completed the reconquest of Bougainville and Buka Islands, the Treasury and Shortland Islands, and New Guinea to and

including Bogia. New Britain has been overrun except for the Gazelle Peninsula, which is still in Japanese hands generally north of the line Matalai River—Powell River.

Allied air has established air superiority over the New Guinea—New Ireland area. Allied and Japanese naval forces are operating in the waters north of New Britain.

The Japanese garrison of the Gazelle Peninsula consists of the Tenth Area Army, strength approximately 30,000 men. For composition and disposition, see Map B.

SPECIAL SITUATION: Map B (Figure 2)

The 3d Light Division (Pack) * landed in the Pondo Harbor area on 12 April. Despite desperate Japanese resistance the operation was successful. By 19 April the beachhead had been cleared and secured, the division at that time being disposed as shown on Map B.

On 21 April, the Commanding General, 3d Light Division, informed his staff that he expected the division to advance in about two weeks to cross the peninsula and capture Keravat Airdrome. Enemy resistance in previously prepared delaying positions was expected.

The intervening period was to be utilized in reorganizing and replacing equipment lost in the landing and subsequent combat. Casualties in the combat teams had been approximately seven percent in CT 7, thirteen percent in CT 8, and one percent in CT 9. No personnel replacements could be expected.

Patrols brought information of Japanese

dispositions confirming those shown on Map B. No Japanese reinforcements had reached New Britain, although an infantry regiment and two battalions of field artillery had been annihilated in the defense of Pondo Harbor.



FIGURE 2.

SOS personnel began to arrive in Pondo Harbor on 21 April, preparatory to taking over its operation as an advance base at an early date.

Troop List, 3d L Div (Reinf)

(Unit designations are assumed)	O	WO	EM	Total
3d L Div	490	19	8,855	9,364
908th Engr C Bn	29	3	632	664
908th Cml Bn	39	1	582	622
910th QM Trk Co (14-ton Trk)	6		203	209
911th Vet Co (Sep)	5		62	67
Det. 915th Sig Ptn Co	2		19	21
Rad Int Plat, 916th Sig Bn	2		30	32
1st to 9th Ptbl Surg Hosp	36		297	333
Total 3d L Div (Reinf)	609	23	10,680	11,312

*In the event that a light division is not available, it is felt that the infantry division could readily be substituted for the light division, with certain modifications in reduced strength, lighter weapons, and substitution of either light truck transport or pack transport.

SPECIAL SITUATION (Continued)

On 26 April, the Commanding General, 3d Light Division, issued the following directive at a staff conference at the division command post in the vicinity of Pondo Harbor:

"The 3d L Div (Pk), marches 3 May to secure KERA VAT AIRDROME, prepared to advance on RABAUL.

"Two RCTs in assault, one RCT in reserve initially vicinity PONDO HARBOR."

The tactical plan for the attack might then resolve itself into the following principal considerations:

Objectives.

Assault units and attachments.

Initial line or initial point.

Axes or zones of advance.

Time of departure.

After a careful consideration of all factors involved, the division staff might arrive at a tactical plan for the jungle operation as follows:

Objective: Keravat Airdrome—Combat team commanders will designate intermediate objectives.

CT 7 on right.

CT 9 on left, replacing CT 8 because of heavy casualties.

CT 8 in Division Reserve, to follow on Division Order.

Composition of CT 7 and CT 9:

1 Inf Regt

1 FA Bn, 75-mm How Pack

1 Co, Engr LC Bn

1 Co, Med Bn

1 QM Pack Co (-)

Attached:

1 Co, 909th Cml Bn

1 Plat, 911th Vet Co (Sep)

3 Ptbl Surg Hosp (1 for ea Bn)

Detail of Det, 915th Sig Pgn Bn

Initial point for each combat team, an identifiable terrain feature on trail along axis of advance, at or near outer limit of beach-head.

Axes of advance, generally along trails indicated on Map B. In "column of file" warfare with movement on trails, boundaries are not considered necessary.

Time of departure, one to two hours after daylight, since jungle movement in force is practical only in daylight and the mosquito hazard is most serious in the early morning and early evening.

In view of the handicap of jungle growth and restricted trails, and the great distance to be traversed in both time and space, it is felt that a "mission type order" will suffice and is preferable to a detailed order. The combat teams must develop the situation by reconnaissance as they cut their way forward and should have the freedom of selecting their own objectives and time of attack at each strongpoint. Coordination, however, must be exercised by division by constant communication with both assault combat teams, particularly at the hostile strongpoints believed to exist. Rate of advance may vary from five to ten miles per day to possibly one hundred yards per day, or no gain at all on some days. Hence the date and time of attack on the division objective, Keravat Airdrome, cannot be anticipated. An operation of this nature may require not only days but weeks.

... Every item taken on a jungle operation must be considered from the points of view of necessity and opportunity for use. No piece of equipment should be landed unless it is intended to make full use of it. Neither should any essential item be landed on D-day or any other day unless it can be taken into use at once. . .

In the early days of jungle landing, routes fit for traffic are few and short, while labor demands are heavy, and failure to restrict vehicles, equipment, and stores to essentials causes administrative indigestion.

—From an official report.

The Communications Zone Engineer

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THE long list of engineer functions set out in Paragraph 24 of Field Manual 100-10, insofar as they apply to the communications zone, can be grouped roughly into three main categories—construction, utilities, and supply. In addition, there is a variety of incidental functions, some overlapping into the main groups. These include real estate handling, maintenance of structures, mapping, camouflage operations, and maintenance of inland waterways.

While these functions closely parallel those of the Corps of Engineers in the zone of the interior, their execution varies widely in the several theaters of operations. As in the case of other elements of logistics—evacuation, transportation, administration, and so on—much depends on conditions in the particular theater and the policies of the theater commander. The governing factor in every theater, regardless of the commander, is the needs of the tactical forces, both air and ground.

In the United States the whole program of construction, repairs and utilities, real estate acquisition and disposition, supply, and civil works is a routine operation. Procedures are set out and followed for every type of activity. Overseas, at least in the initial stages of an operation, just the opposite is true. From the time the engineer puts his foot on shore his every move, almost, is characterized by one word—improvise. This holds despite all the planning he may do in advance, because, unlike most of the other services, he must depend a great deal on what he finds in the theater to get his job done. Of course, as things settle down SOP's will be established, but even then engineer operations will call for much improvising. In this country when it's a matter of construction, the engineer does the planning, lets the contractor, and then sees to it that the contractor does a good job. Tools, labor, and materials may be a problem, but there is usually some setup to make them available. Overseas there's a job to be done, a hospital or airfield to build, a bridge to re-

construct—and its got to be done right now. There isn't any contractor to call on for bids, nor a depot on a double-track railroad with everything needed for the job. It's up to the engineer to get it done with the means he has, which brings us right back to that word, improvise.

Reports from theaters are replete with instances of engineers making the most of what they find. For example, a favorite substitute for concrete forms in several theaters is fifty-gallon oil drums with the ends blown out. Engineers of the Eastern Base Section of the North African Theater of Operations found ancient one-way stone bridges in Tunisia which had to be widened for heavy military traffic. Abutments for the widenings were quickly constructed by use of the handy oil drums stacked one on top of the other and filled with concrete. These discarded containers also made excellent retaining walls and, painted white and filled with stone, served nicely as markers at bridge approaches. Electrical equipment initially was very scarce in Tunisia. Lacking sockets for light bulbs in the hospitals, the engineers solved this problem by soldering the wires directly to the bulbs. Empty food tins served as reflectors for operating rooms. The height of expediency, perhaps, was reached in the laying out of red crosses for hospitals for identification from the air. Red paint being scarce, the engineers made the crosses out of red iron ore against a background of crushed limestone. A quick lumber-saving expedient in construction of siding for mess halls and other temporary buildings was the use of building paper sandwiched between layers of chicken wire and stretched tightly over wood frames.

An idea of the vast amount of work involving on communications zone engineers in an area like the United Kingdom is obtained from the report of the Chief Engineer of the Services of Supply, European Theater of Operations, dated 31 December 1943. The build-up, then in full blast, for the coming

invasion called for provision of shelter for vast numbers of American troops, of which about 400,000 accommodations were new construction, mostly by engineer troops. The rest of the shelter consisted of existing buildings, provided by the British. More than 90,000 hospital beds were made available, and storage and depot space amounting to nearly 70,000,000 square feet was prepared. In addition, storage for more than 200,000 tons of petroleum products, over 400,000 tons of ammunition, and 52,000 vehicles was provided. Runways and other hard surfaces provided for United States Army Air Forces in the United Kingdom were equivalent to a twenty-foot concrete highway from New York to Berlin.

In North Africa, the engineers of the Eastern Base Section during a nine-month period last year repaired and maintained between 500 and 600 miles of roads, including the bridges; built and maintained more than thirty evacuation, general, and station hospitals; established six major engineer supply depots; built 450 miles of oil pipelines with connecting installations; and repaired and reconstructed port facilities at Bizerte and Ferryville for the launching of the Sicilian and Italian invasions. This, of course, in addition to maintaining a continuous supply of engineer materials and equipment to both combat and service troops.

Basic principles of construction in a theater of operations are simplicity, flexibility, economy, and availability of materials. Simplicity is important in all military operations. It is difficult in construction because we are not accustomed to it. The trend in modern civil construction, of course, is in the direction of complexity. Simplicity in military construction means the use of standard plans simple in design, and materials that are easy to work with, like wood. Engineer Technical Manuals 5-280 and 5-281 are folios containing standard plans for all sorts of theater of operations structures. In our European Theater of Operations additional plans, adapted to conditions there, have been published.

Flexibility calls for designs that will con-

form to local conditions and allow expansion of facilities. Plans should be flexible enough to provide for the use of any materials readily available. In Egypt, wood was scarce but brick and stone were plentiful and civilian labor was cheap, so our engineers modified the standard plans to permit masonry construction. In the United Kingdom, metal huts have been favored for military construction.

Economy refers not so much to savings in cost as savings in time, transportation, and manpower. This principle also calls for use of local materials, elimination of non-essentials, and standardization of design. Buildings are designed for a life of only one or two years.

The principle of availability of materials means avoidance of the use of strategic materials such as tin and rubber, and critical materials, like cork and asbestos. Local procurement also figures in this connection.

These principles are implicit in War Department Memorandum No. W100-18-43, "Oversea Construction Policy," dated 8 July 1943. Pertinent extracts follow:

4. SHIPMENT OF CONSTRUCTION EQUIPMENT AND MATERIALS FOR OVERSEA CONSTRUCTION.—The shortage of available cargo space is such that it is absolutely imperative that no construction not indispensable to the war effort be carried out with material or equipment shipped from the United States. Oversea theater, defense, department and base commanders, and the Commanding General Army Service Forces, will therefore strictly limit the oversea construction programs for which they are responsible by:

a. Complete abandonment of those projects which are not absolutely indispensable to the war effort.

b. Substitution of temporary theater of operations type construction for such permanent, semipermanent, or mobilization type construction as may have been contemplated previously. The approved theater of operations structures and designs are shown in detail in TM 5-280 and 5-281.

c. Further exploitation and development

of local construction material resources (especially lumber, even though of poor grade) and a redesign of structures where practicable in order to make further use of local materials rather than of importations from the United States.

d. Careful establishment of priorities of individual items within the program in order to insure timely completion of those facilities of most value to the war effort.

5. DETERMINATION OF REQUIREMENTS.—Specifically, determination of requirements for construction outside the continental United States will be governed by the following general policies:

a. Permanent and semipermanent construction will not be authorized except for such works as must be of a permanent type in order to perform their war functions.

b. Closed storage will be of temporary type and will be provided only for such items as cannot be stored otherwise.

c. In all climates the maximum use will be made of billets and tentage, and of shelter that can be constructed with local materials. Any construction that must be carried out will have as an outside limit the designs provided in the Technical Manuals referred to in paragraph 4b for the appropriate climates.

d. Airfields will be developed only to the extent necessary to provide adequate load-bearing qualities and to insure continuous operation under the anticipated range of weather conditions.

e. Water supply and sewage disposal facilities will be limited to the barest essentials for the health of the command.

With respect to policies and procedures on construction, communications zone engineers, many of them with long experience as army engineers in this country, have adapted to their new jobs the procedures with which they were familiar. This is particularly true in the matter of site selection and authorization of construction. When a large cantonment, hospital, or airfield is to be built, a site board has the job of investigating and recommending the selection. The Engineer on

this board is the most active member. He corresponds to the District Engineer in this country working with representatives of the Service Command and other interested agencies. After the site is approved a directive for construction is issued by the Communications Zone or Theater Chief Engineer, much like the directive issued by the Chief of Engineers for zone of the interior construction.

Utilities ordinarily charged to communications zone engineers include water supply, sewage disposal, electricity, gas, and waste disposal. Utilities in which they normally have no responsibilities are signal communications, charged to the Signal Corps, and transportation, a Transportation Corps function. Engineer utilities in the theater frequently are more closely related to construction than in the zone of the interior, because the same organization which erects a group of buildings, either with troop units or civilian labor, may have an area responsibility for maintenance of the buildings and operation of the utilities serving them. The problem of utilities ranges from one of tying in with existing facilities in a friendly country, such as England or France, to the establishment of complete facilities where they are non-existent or have been destroyed or damaged by military action. After the fall of Palermo the engineers found forty breaks in the city water system and many more in the sewer system. No time was wasted in seeing that local officials got on the job, but it was the engineers' responsibility to see that the systems were repaired. Efforts are always made to find equipment for repairs and maintenance within the area, although sometimes it is necessary to ship the materials in. In this connection, the principles applying to construction—simplicity, flexibility, economy, and availability of materials—are fully as applicable in the operation of utilities. Maintenance problems, of course, include those created by sabotage and enemy air bombardment.

The third major engineer function in the communications zone, supply, is considerably broader than the supply function of most of

the other technical services. First, there is the normal supply of the wide variety of technical engineer equipment, which is the type of supply activity common to all the services. It includes provision, not only of operating equipment used by engineer troops, such as bulldozers, tractors, air compressors, bridging equipment, mapping equipment, and so on, but also materials that are supplied to other troops, like tools, barbed wire, and camouflage equipment. Added to this standard equipment is the tremendous bulk of construction and maintenance equipment, such as gravel, rock, cement, sand, and lumber. Finally, to complete the supply picture must be added water supply and map production, reproduction, and supply.

Also in the supply picture is the maintenance of engineer equipment, a broad field in itself. Much of the equipment is highly technical in nature and needs constant maintenance in all echelons due to the heavy demands on it. Obviously, the better the maintenance in the theater, the smaller the demands on the zone of the interior for replacement.

So the Supply Officer on the staff of the Communications Zone Engineer has a heavy responsibility. He must first determine the requirements and then solve the problem of procurement. Many items, particularly those of technical nature, must be shipped from this country, but he will usually be able to obtain large quantities of construction and other materials from local sources. In some of our theaters the procurement office is a large section of the engineer supply office. Branches are established in the more important trade centers, with engineer officers in charge, assisted by local civilians familiar with conditions in the area. Having obtained the supplies, either locally or by shipment, the next job is that of issuing them to the troops. There are usually several engineer depots or engineer sections of general depots in the communications zone. The current trend is toward elimination of administrative overhead by grouping depots of the various services under general depot control. Space for engineer storage is among the lesser worries

of a general depot commander, since the bulk of engineer supplies—about eighty-eight percent—can be stored in the open.

The organization for engineer service in the communications zone may be decentralized to the sections of the command or it may be

ENGINEER CONSTRUCTION ORGANIZATION Decentralized

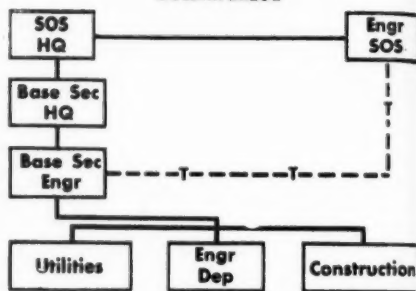


FIGURE 1.

centralized under control of the Communications Zone Engineer. Figure 1, reproduced from a chart prepared by the Office of the Chief of Engineers, shows an SOS engineer construction service and organization, decentralized. The section commander, through his section engineer, controls construction, utilities, and supply and is limited in these activities only by the Commanding General of the SOS or communications zone. The Chief Engineer, SOS, in discharging his responsibilities, maintains liaison with section engineers to inform himself of progress, give technical advice, and assist in breaking bottlenecks in matters of equipment and matériel. He has no direct authority over section engineers and must process any necessary corrective orders through command channels.

Figure 2 gives the picture under centralized operation. Utilities and other functions such as depot operation, and even minor construction, are still decentralized to the sections, but the construction service functions directly under the SOS Chief Engineer. This service is superimposed territorially on the sections through a number of construction districts, which may or may not have the same

boundaries as the sections of the communications zone. All major projects are approved by the Commanding General, SOS, who also fixes priorities of construction in accordance with theater directives. If a section commander desires additional construction, he may

ENGINEER CONSTRUCTION ORGANIZATION Centralized

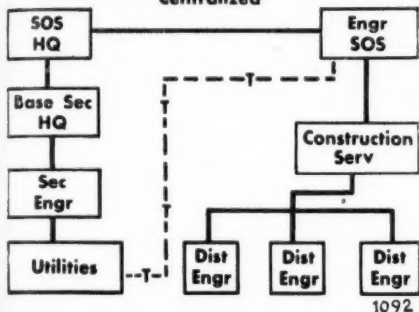


FIGURE 2.

call directly on the district engineer who will act in accordance with his authority from the SOS Engineer. The principal argument in favor of centralized control is that the higher headquarters knows better than the lower what the priorities for construction should be, based on overall needs of the theater and availability of matériel and troops to do the work.

Any discussion of personnel available for accomplishment of the engineer mission in the communications zone would be incomplete without mention of civilian labor as a basic commodity. Our engineers all over the globe, from the jungles of New Guinea to the mountains of Italy, employ native labor in great numbers, thus enabling maximum benefit from the skill and training of the troop units.

Standard engineer units available for use in the communications zone are described fully in Field Manual 5-5, "Engineer Troops."

They include general and special service regiments, construction groups and battalions, separate battalions, water supply companies, dump truck companies, base topographic battalions, port construction and repair groups, petroleum distribution companies, forestry battalions and companies, maintenance companies, and base depot groups with their normal components—base depot companies, base equipment companies, parts supply companies, and heavy shop companies. A recently organized engineer unit is the engineer petroleum production depot. It consists of a headquarters and headquarters company, refinery battalion, oil field battalion, and special construction company. This depot is capable of drilling one hundred wells to a depth of between 1,000 and 4,000 feet during a period of a year, of operating a plant for production of crude oil, and constructing and operating an oil refinery plant with a capacity of 20,000 barrels of crude oil a day.

Of increasing importance in the communications zone engineer establishment is the engineer service organization, also of relatively recent origin. It is one of the so-called T/O&E 500 series, common to all the technical services and providing a flexible type unit suited to the needs of particular installations. Administratively it may have a platoon, company, or battalion organization, depending on its size. Teams of varying size which may make up the composite unit include depot, maintenance, utilities, fire-fighting, gas generating, water purification, well drilling, searchlight maintenance, dump truck, water distillation, dredge crews, port repair ship crews, floating power detachments, and foundry units. These teams, or cells, may be assigned to small fixed installations where the need for engineer service is not sufficient to warrant the use of standard units, or where standard units do not provide the required service.

Wherever one turns for accounts of recent operations, one is struck by the absolute and vital necessity for all commanders to be able to handle all arms; therefore we must know each other and yet be ourselves.

—Major General H. L. Birks

Armored Artillery -- Organization for Combat

MAJOR PAUL S. CULLEN, *Field Artillery*

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IN organizing the field artillery of his command for combat, a commander is faced with certain basic considerations. These include: first, the attachment of artillery units to other subordinate units of the command whenever necessary; second, the assignment of specific missions to each unit remaining under his control (i.e., direct support, general support, reinforcing missions); third, the forming, dissolving, or rearranging of artillery groups. The artillery officer advises the commander on all these points.

This problem has been largely solved in infantry divisions where permanent combat teams are formed. In an armored division, it is necessary to form temporary task forces or combat commands designed by their organization to perform a specific task. In order to see how the organic field artillery of an armored division fits into these combat commands, the nature of armored action must be thoroughly understood.

FM 17-100, The Armored Division, states: *"Its [the armored division's] primary role is in offensive operations against hostile rear areas."* This role is carried out by dividing the division into a base of fire, a maneuvering force, and usually a reserve. Armored division action will be a continuing series of attacks against successive intermediate objectives, in which the maneuvering force is supported by the base of fire. These successive intermediate objectives ought to be well within artillery range of each other in order that artillery in the base of fire can support the capture of the objective and also neutralize hostile antitank guns which can fire on the objective. When the maneuvering force has captured the first of the intermediate objectives, the base of fire displaces forward, organizes the objective, and covers the reorganization of the maneuvering force which then attacks the next of the objectives, supported by the new base of fire. The base of fire is essentially an artillery force; the maneuvering force is essentially a tank and infantry force.

The principles discussed above can best be illustrated by a specific situation as follows:

I. Situation: *a.* I Corps attacks through breach created by II Corps between Albert and Fresnoy. Column of divisions: 1st Armored Division, 3d Infantry Division (Motorized), 2d Armored Division.

b. II Corps holds breach open to depth of five miles.

c. 1st Armored Division leads attack to seize high ground north of Beauvois.

d. CCA (Combat Command A) leads attack in column of battalions, 1st Tank Battalion leading. CCB (Combat Command B) forms base of fire on successive intermediate objectives.

II. Organization for the attack:

CCA

1st Tk Bn
2d Tk Bn
3d Tk Bn
1st Armd
Inf Bn

CCB

2d Armd Inf Bn
3d Armd Inf Bn
1st Armd FA Bn
2d Armd FA Bn
3d Armd FA Bn
Hq & Hq Btry
Div Arty

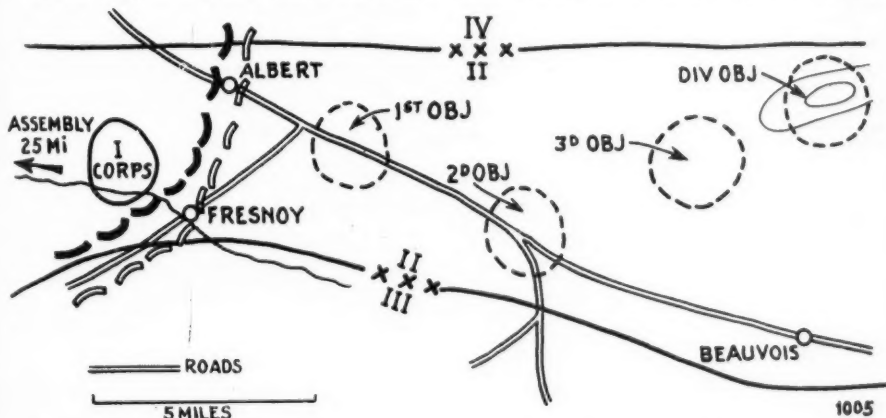
In organizing the artillery for combat the division commander's first consideration was the necessary attachment of battalions to combat commands. Several things influenced his decision to attach the entire divisional artillery to CCB. First, he wanted to make both his maneuvering force and base of fire as strong as possible in their respective capabilities. This could be done because with two divisions following behind, a reserve need not be held, and because the successive objectives are well within artillery range of each other. No artillery need be placed in CCA because it will remain within artillery range. CCA has greatest possible maneuverability and CCB has maximum fire power. All artillery was placed in CCB in order to get the increased effect of massed fires and in order to protect the artillery and coordinate its movement.

It must be clearly understood that the mission of CCB is essentially an artillery mission; i.e., support of CCA in the capture of each objective in turn. Three full battalions of artillery under the division artillery commander in CCB will be able to render continuous massed fire in support of CCA. This is the point that is so often missed: *the sole mission of the artillery with CCB is to support CCA, not CCB.* The CCB commander will be unable to divert the artillery support from CCA without violating the orders of the division commander.

In this case, or any case where the inter-

pared to render direct support to the 2d Tank Battalion when committed. The 3d Armored Field Artillery Battalion was placed in general support with priority of fires to CCA, prepared to render direct support to the 1st Armored Infantry Battalion when committed. This arrangement gives the maximum support to the leading elements and has enough flexibility to meet all except major changes in the plan of action.

The final point considered was the forming of an artillery group. In this case it would have been possible, because a common mission existed, to form a general support



mediate objective is well within artillery range. CCA will receive more artillery support than if it had attached artillery. Within the range of the pieces, the closeness and adequacy of artillery support is a function of observation and communications, not of muzzle-blast.

The next point of consideration was the assignment of missions. To say the artillery supports the action was not enough—specific missions had to be assigned. Specific missions enable each artillery battalion commander to render maximum support. In this case it was decided to place the 1st Armored Field Artillery Battalion in direct support of the 1st Tank Battalion. The 2d Armored Field Artillery Battalion was placed in general support with priority of fires to CCA, pre-

pared to render direct support to the 2d Tank Battalion when committed. This was not done for two reasons: First, the common mission of these two battalions will cease as soon as CCA commits another tank or infantry battalion. This is likely to occur very early in the action. Second, three battalions are not too many for the division artillery headquarters to deal with. One reason for forming groups is to eliminate an excessive number of units with which a headquarters might have to deal. Three is not excessive.

This is an illustration of the pure application of theory. Seldom will a real situation permit such employment. The principles, however, are unchanging. The measuring-worm pattern for armored action as set forth

in FM 17-100, The Armored Division, is sound. The three considerations in organizing artillery for combat are basic.

This concept of organization of the artillery for combat may seem unusual, but there is only one thing to prohibit its working—a CCB commander who does not understand his mission. This method of organization for combat deprives either CCA or CCB of an independent role; this is proper. Today's war

is ever proving the advantages of cooperation. The CCB commander must be a particularly cooperative and able officer. He must understand his mission with an infantryman's knowledge of organization of ground, with a cavalryman's knowledge of the maneuvering force, and with a field artilleryman's zeal to support. CCB should be commanded by the brigadier general of the line in the armored divisions.

Air Battles of the Last War

Digested at the Command and General Staff School from an article by Group Captain M. G. Christy in *Britain* (British Information Services) August 1944.

WHEN I read that Bomber Command has blasted an enemy objective with 3,000 tons of high explosives, it reminds me of one of the earliest systematic night bombing raids ever carried out. That was twenty-seven years ago, during the last war. My pilot dropped what was then a record weight of bombs in one night—two and a half tons. For this feat we received a telegram of congratulation from General Trenchard at Headquarters.

Our squadron airplanes were FE-2B5 planes, painted black, each equipped with a single Beardmore engine of 160 horsepower, capable of a cruising speed of sixty miles per hour. A modern bomber has 6,400 horsepower and cruises at 240 miles an hour.

Our bomb loads ranged between 200 and 300 pounds per machine. The present day Lancaster carries 18,000 pounds. Our largest bomb weighed only 230 pounds, compared with the 12,000-pound blockbuster, but at that time we thought it was a terrific weapon.

We aimed our bombs by guesswork, judging the distance with our eyes; we had no bombsight and dive bombing was then unknown. Each crew, consisting of a pilot and an observer, had been given a systematic course of aiming and dropping dummy bombs. But most important of all, pilots were trained

to come down low over the target, anything between 1,500 and 500 feet.

In those days we had no radio and no radiolocation, but our night bombing squadron could usually rely on certain keen-eyed, quick-witted crews finding their way to the target even on dark, moonless nights.

In 1917 enemy anti-aircraft ground defenses at night consisted of machine guns and pom-poms, but even these could be most unpleasant to pilots flying at low altitudes. Our casualties, however, were not very heavy. Certainly, lighter than in day bombing squadrons. We rarely encountered night fighter planes, which were not used systematically by the enemy until about the middle of 1918. As soon as we were back over our own air-drome our machines signalled with our wing-tip navigation lights and we made landings by the flood lighting of a narrow strip of ground. We could do this easily because our landing speed was only about forty-five miles per hour, about one-third of the Lancaster today.

Of course our striking power was very small. Yet even in those first few months we occasionally achieved a visible military success, such as the blowing up of a munitions train in a railway yard, or an ammunition dump, or the destruction of a few hangars containing enemy aircraft.

Postwar Planning and the Army Service Forces Training Centers

COLONEL L. W. PRENTISS, *General Staff Corps*
Deputy Director of Troop Training Division, Army Service Forces

WITH each success of Allied forces in the several theaters of war comes added emphasis on the need for and importance of postwar planning. We were faced with a similar problem after World War I and as a nation we failed to adopt an adequate program for national defense. We should lay sound and careful plans for our postwar military training program, and have these plans ready for adoption when fighting stops. Most of the recent polls on the subject indicate that a majority of our people are convinced that some type of peace-time universal military training is essential.

In considering a postwar training plan, we must not go back to our pre-Pearl Harbor concepts. We may, however, salvage such of those concepts as proved valuable in the expansion and training of our present Army and use them as the foundation stones of our new training structure. We should abolish forever the ideas, programs, and plans that did not produce properly trained men, officers, or units.

Regardless of the details of our final postwar plan, the training center with its programs for basic military and basic technical training for both individuals and units will play a major part. The lessons we have learned and the experience we have gained in the operation of these training centers during the past three years must be capitalized upon. The Director of Military Training, Army Service Forces, has already incorporated many of these ideas into the 1944 plan of operation of the Army Service Forces Training Centers which combines the functions assigned earlier in the war to the replacement training centers and the unit training centers. It is believed that a description of this plan is opportune at this time.

Army Service Forces Circular No. 104, dated 15 April 1944, and now superseded by

ASF Manual M4, was the authority for the establishment of the Army Service Forces Training Centers and for the adoption of the preactivation plan of unit training. Prior to April, the Army Service Forces operated replacement training centers, where individuals were trained as loss replacements, and unit training centers, where units were activated and trained. Some units were also activated and trained at other stations when military necessity demanded their immediate activation and facilities at unit training centers were not available. The purposes behind the 1944 training plan were in general four:

- a. To raise the general standard of training, particularly that of individuals in units and of units themselves.
- b. To make more efficient use of personnel, both trainer and trainee, and of the facilities available to the Army Service Forces for the accomplishment of the overall training mission.
- c. To determine the training requirements and to train in accordance with those requirements.
- d. To insure that the end product of the plan meets the specifications of the MOS [military occupational specialty] requirements, particularly the specialists assigned to the units.

Most of the Army Service Forces Training Centers were formed by the conversion of existing replacement training centers and unit training centers. The previous method of training loss replacements in replacement training centers was well conceived, well planned, and in general, well executed. The unit training center plan, however, had many weaknesses and the standards of training achieved in those centers generally were below those reached in replacement training centers. The previous system of training had many disadvantages, particularly from the

point of view of unit training. Often the unit cadre, though qualified to perform their duties functionally, were not qualified trainers. The fillers frequently did not include men with the qualifications and backgrounds necessary to undertake the basic technical training. The procedures for replacing the unsatisfactory personnel were cumbersome and time-consuming, and not infrequently the second group of fillers received were no better than those they replaced. Hence we often found units with sizeable increments of their fillers in several different stages of training. The problems incident to the organization and initial functioning of a unit with accompanying administrative and supply worries frequently consumed too much of the attention of the unit commander and his officers and, as a result, the standard of individual training suffered through lack of adequate supervision. In many instances the cadre, both officers and enlisted men, were functioning in their new capacities for the first time, and had been selected as cadre because of potential ability rather than demonstrated ability. Some units during the first six months after activation experienced as high as a 300 percent turnover of personnel. This turnover was caused by cannibalization to provide trained specialists for other units in higher priority and by the efforts of the unit commander to obtain personnel physically and mentally qualified to take the training. The standard of individual training in units was markedly below that reached by the replacement training centers.

The new Army Service Forces Training Centers conduct four types of training; namely, basic military training (six weeks), basic technical training (eight weeks), team training (three weeks), and unit training (six weeks). Mobilization Training Program 21-3, applicable to all Army Service Forces Training Centers, prescribes the training to be given all Army Service Forces trainees during the basic military training phase and also prescribes the concurrent basic military training to be given during the technical training and team training phases. Mobilization Training Programs prepared by each Technical Service prescribe the technical

training for technical, team, and unit phases. The basic MTP 21-3, applying as it does to all services, gives great flexibility to the Army Service Forces program since all trainees, including those assigned upon completion of basic military training to the Medical Corps, receive the same training in military subjects and therefore can be converted quickly and readily from one service to another by giving instruction in only the basic technical subjects.

Regardless of the sources of the trainees in an Army Service Forces Training Center and regardless of their ultimate disposition, all receive the same basic military training and appropriate technical training. The output of a training center (see Figure 1) is used to furnish loss replacements, rotational replacements, zone of interior physically limited replacements, and to activate new units. Team training is given to those individuals who are selected as loss or rotational replacements after completion of basic military and basic technical training. Units are activated within the center with personnel which has completed basic military and basic technical training. Unit training is given after activation and is designed to weld these individuals into a functioning team by applicatory training. Specialists for all uses are trained both at service schools and in specialist courses within the Army Service Forces Training Center. Some specialists require more than eight weeks of technical training. This additional training time is authorized and is taken into consideration in preparation of training plans.

The personnel available to the Army Service Forces Training Center for training all go into the training pool (see Figure 1) which includes inductees received direct from reception centers and enlisted men of all grades received from other sources by reason of the reduction in or inactivation of units, the elimination of physically fit enlisted men from station complements, rejection from officer candidate schools, or return from overseas. Some men will require seventeen weeks of training, others only a few weeks, and still others no training at all. Any who are tech-

nically qualified and have returned from overseas or are physically not qualified for overseas service can be interchanged with the operating overhead. The replaced cadremen can be utilized by the Commanding General, Army Service Forces Training Center, to fill any demand made upon the center. Men from reception centers are not necessarily destined to become loss replacements and men received from any other sources may be used to fill loss replacement requirements.

The key to efficient organization and operation of Army Service Forces Training Centers is flexibility. If the flexibility is destroyed, we do not have an Army Service Forces Training Center, but instead have a replacement training center and a unit training center operating under a single headquarters with all the faults of both and none of the advantages of the Army Service Forces Training Center.

It should be emphasized that we do not conduct loss replacement training, but instead furnish trained loss replacements. Likewise, we do not conduct preactivation training as a type of training, but instead conduct basic military and basic technical training prior to unit activation.

The trainer, administrative, and supply personnel required for the operating of an Army Service Forces Training Center are divided into two parts:

a. Operating overhead—normally twenty-four percent of the loss and rotational replacement capacity, plus three percent of the preactivation and unit training capacity.

b. Non-operating overhead—normally equivalent to the cadre and trainer personnel for all units in preactivation training.

In general, a training center may be considered to possess the desired flexibility if:

a. It is properly organized.

b. Proper distribution of basic responsibilities has been made to the several echelons. These responsibilities include administration, supply, transportation, discipline, morale, housekeeping, and training which may be subdivided into supervision, planning, scheduling, conducting, and testing.

c. One standard of training exists in the center, regardless of the source of trainees or their ultimate disposition.

d. The relative number of training units conducting basic military training and basic technical training is variable, depending upon the proportion of trainees entering the center

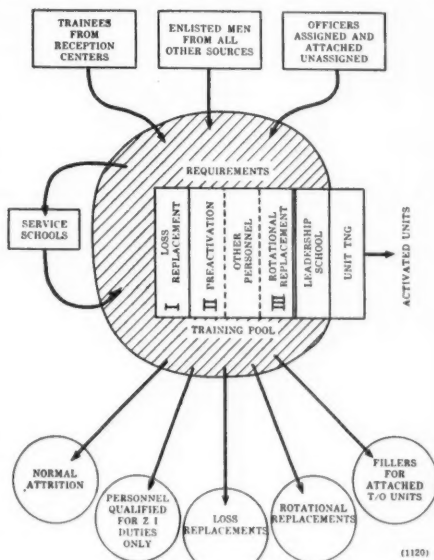


FIGURE 1.
OPERATION OF AN ARMY SERVICE FORCES
TRAINING CENTER.

who require basic military training as compared to the number requiring only basic technical training.

e. The units in the groups mentioned in paragraph d above are echeloned to insure continuous trainee output and a minimum of lost training time.

f. There is an equal distribution of the operating and non-operating overhead to insure a feeling of stability and continuity in all phases of training, administration, and supply. The operating overhead should be draped over the Army Service Forces Training Center as a camouflage net is draped over a truck; and the non-operating over-

head should be woven into the net wherever needed to insure maximum efficiency.

g. There is no earmarking of trainees by name for any assignment prior to completion of basic military and basic technical training, unless the type of technical training given is required only by specialists trained for a particular unit. As soon as a trainee starts team training, he becomes earmarked tentatively by name as a loss replacement. However, as long as the numbers required for loss replacement and preactivation requirements are maintained, qualified individuals may be interchanged as the training center commander sees fit.

h. There is no designation of training units within an Army Service Forces Training Center as preactivation of loss replacement units.

i. All attached unassigned personnel and all assigned overhead are considered available by the training center commander for

any use in carrying out his training missions. Officers and enlisted men ordered into the training center as a result of preactivation instructions are eligible for and may be assigned to responsible training, administrative, or supply positions in the training center and, despite the preactivation instructions, are not necessarily earmarked for assignment to a particular unit.

The organization chart (shown in Figure 2) for an Army Service Forces Training Center is only a guide, since local conditions and availability of qualified key personnel may dictate a different solution. However, the suggested chart is flexible and subject to expansion or contraction to fit training centers of almost any size. The chart is divided into three levels as follows:

- The command and control level.
- The staff level.
- The operating level.

The fact cannot be too strongly emphasized

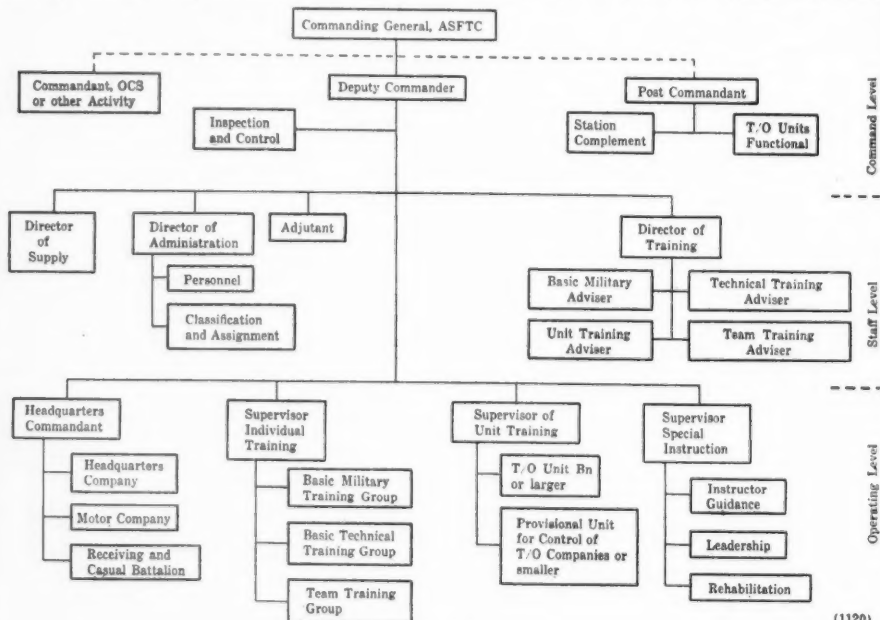


FIGURE 2.
ORGANIZATION CHART FOR AN ARMY SERVICE FORCES TRAINING CENTER.

that the first two levels exist only that the third level may accomplish the primary mission of the center; namely, the training of individuals and units.

Since the commanders of some Army Service Forces Training Centers also command the post and other activities, the chart shows by dotted lines the additional assistants who may report directly to the Commanding General and are responsible for all matters pertaining to their special activities.

There are four key requirements in the operation of an Army Service Forces Training Center. These are:

- a. Efficient operation of the Leadership Course and subsequent employment of its graduates.
- b. Efficient operation of the Instructor-Guidance Course for officers and proper utilization of attached officers.
- c. Accurate preparation of the weekly report showing the surplus or shortage of personnel and facilities.
- d. Thorough understanding of and conformance with Form 88-1, which is the unit preactivation training plan.

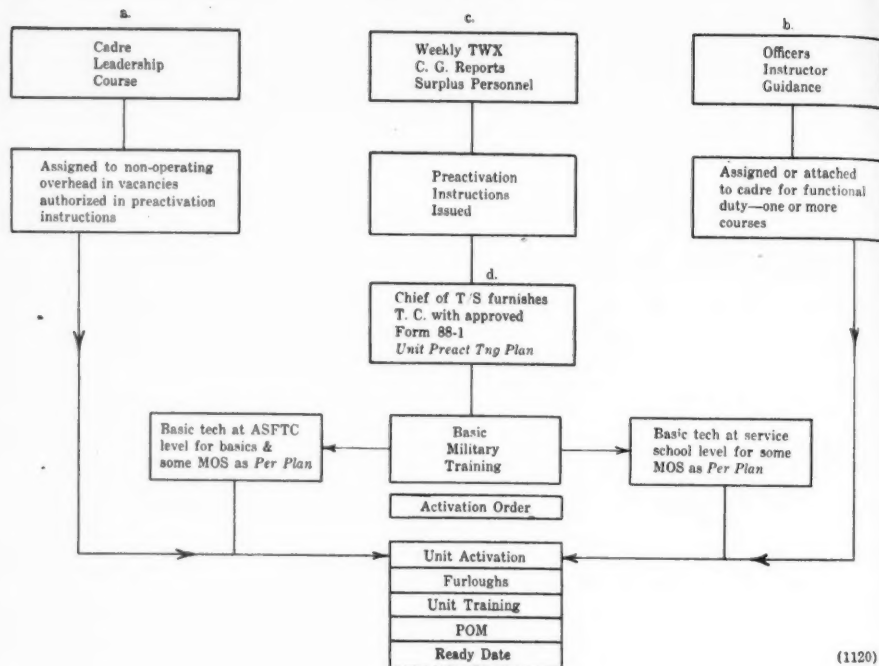
The Leadership Course, with three weeks of theoretical instruction and six weeks of practical application for the student as a trainer, is our main source of non-operating overhead and of cadremen for the activation of new units. Selected graduates of the Leadership Course are absorbed in the non-operating overhead in a trainer, administrative, or supply capacity and serve through a preactivation cycle of fourteen weeks. At the expiration of that time, the best of these men are selected as unit cadre. Without this constant source of qualified potential cadremen, the entire system of preactivation training would break down. Great care is exercised by the training center commanders in the selection of men to attend the Leadership Course and still greater care is taken in the selection of the officers and noncommissioned officers who conduct this course. Graduates of the Leadership Course are utilized, first, as non-operating overhead; second, as cadre for units; and third, as loss

or rotational replacements; but the third use is resorted to only when the man has failed to demonstrate leadership qualities or when no vacancy exists for him in the first two categories.

Many of the officers who are being ordered into our training centers are well qualified technically for a troop assignment but are not well qualified from a military point of view or as instructors. The Instructor-Guidance Course is designed to prepare these officers to become efficient instructors and to give them a firm foundation in military subjects so that they may be assigned responsible command, administrative, or supply positions during the period of preactivation training, and assume those positions with a reasonable amount of confidence. Officers are assigned to responsible jobs and are made to demonstrate their ability to function in those jobs before being selected as unit cadremen. It is often desirable to absorb attached officers for assignment to a unit, and this step is authorized. Field officers lacking in troop experience are sometimes placed in command of training companies or even platoons in order to obtain the necessary military background prior to assignment to an activated unit.

The weekly TWX represents the training center commander's statement as to the ability of the training center to accomplish the missions which it has been assigned, and to accomplish additional missions if surplus personnel is in fact available. The personnel requirements which include trainees for Loss Replacements, Rotational Replacements, Preactivation Training, Leadership Course, OCS quotas, and unfilled requisitions from attached T/O units are computed weekly and compared with the available physically qualified personnel. This difference, plus or minus, together with available bed space or bed shortage is reported weekly by TWX to Military Personnel Division, Army Service Forces. Decisions to preactivate units are made in Washington based partially upon these reports.

Upon receipt of notification from the Mobilization Division, Army Service Forces, of the contemplated issuance of preactivation



(1120)

FIGURE 3.
CHART SHOWING RELATIONSHIP BETWEEN THE FOUR KEY REQUIREMENTS IN THE ARMY SERVICE FORCES TRAINING CENTER OPERATION PLAN.

instructions, Requirements Branch contacts the Chief of the Technical Service concerned, and directs that the Unit Preactivation Training Plan be prepared on the prescribed form. This report, after approval by the Training Requirements Division, is forwarded through the Chief of the Technical Service to the training center commander and becomes the basis for the individual training conducted prior to unit activation. In addition to specifying the dates of arrival of the cadre, and the trainee increments, the plan specifies the number of trainees to be trained in the various MOS [military occupational specialties] and indicates where these specialists are to receive their training and the starting date of the specialist course. If the training center commander follows this plan there is no excuse for arrival at D-day without the

proper number and types of trained individuals, provided the individuals have been available to initiate the training as planned.

Figure 3 shows the relationship between the four key requirements for successful training center operation. The weekly TWX is the basis for the decisions made in Washington, which result in the issuance of preactivation instructions, which in turn are the basis of the unit preactivation training plan prepared on Form 88-1.

The output of the cadre Leadership Course, after receiving preactivation training in the non-operating overhead, is available for selection as the enlisted cadre for the unit. The graduates of the Officers' Instructor-Guidance Course after receiving experience in functional duty, as non-operation or operating overhead, are available as a source

of officers for the unit. The fillers upon the completion of basic military training receive their basic technical training either at the training center level or at school level, and in either case as prescribed by the unit pre-activation training plan, and complete this training in time to join the unit on D-day. Normally, furloughs are given immediately after activation and if possible the key personnel of the cadre should complete their furloughs prior to D-day, so that during the furlough period the administrative and supply problems of the unit can be solved, and upon return of the fillers from furloughs the unit training phase can start without interference. Upon completion of the six weeks of unit training, the organization completes its

preparation under POM [Preparation for Overseas Movement] and is prepared for its readiness date.

If the operating plan is properly carried out, units are activated on D-day with all individual training completed, and in the 55-80 days between D-day and readiness date, receive the unit training necessary to prepare them to perform their primary mission.

Thus all phases of training have been integrated and coordinated to produce properly trained individuals and units to meet War Department requirements in a minimum of time. It is obvious that the plan can be readily adopted for use in training the postwar Army under any system of universal military training which may be developed.

Parachute Padres

From a British source.

THE British Army Chaplains attached to paratroop units have dropped with their men into battle behind the lines in Normandy, North Africa, Italy, Burma, and wherever airborne troops have seen action.

Like the paratroopers themselves, parachute padres are 100 percent volunteers, and they go through the same toughening training, wear the same uniform—battle dress, anklets, tin hat, and the distinctive long parachute blouse. The only difference is the ecclesiastical "dog-collar" and their lack of arms.

They share completely the lives of the paratroopers, and the men have accepted them like brothers-in-arms. To quote one of these padres: "We do not have to hurl our religion at the men. It is enough that they look at us and say to themselves, 'Well, at least here's a bloke who doesn't have to do it!'"

In the midst of battle and in close-quarter struggle they give consolation to the wounded, help to bury the dead, and some give their own lives.

The padres find that they can ease the nervous tension and inspire great confidence in the tense moment just before the drop begins simply by talking "about trivialities, mostly," says one chaplain. "The first half of the men see that we are ready to jump and the second half see us do it. It gives them heart."

When the parachute padres drop into action, they carry in their breast-pouches, instead of the customary spare clips of ammunition, their communion sets, and their first aid equipment. That is all. They are all trained in first aid, and often a padre will act as an on-the-spot dresser or stretcher-bearer.

The terms of all chaplains' enrollment are the same—no arms to be carried, protection under the Geneva Convention, and the privilege of being repatriated if taken prisoner. This last named advantage is never claimed; by an unwritten law the padre always stays with his fellow prisoners-of-war.

In the first twelve weeks after D-day, seven Army Chaplains were killed in action in France and twelve wounded—a high proportion to the number serving.

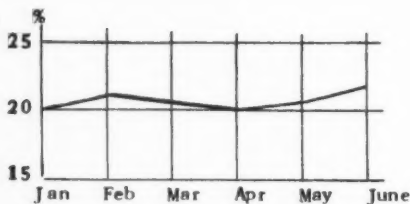
How to Get Facts and Influence People

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Instructor, Command and General Staff School

THE scene is the office of Major General A, Commanding General of an air command. The General has been studying several charts showing the results of several months of combat operations by his command. The particular charts absorbing the General's attention at this time involve a tabulation of data on the number of noneffective combat sorties¹ resulting from the various operations performed by units of his command.

These were the charts the General was looking at:

ABORTIVE FIGHTER SORTIES AS
PERCENT OF FIGHTERS DISPATCHED
BY MONTHS



The condition revealed by the charts was far from satisfactory, since an increasing abortive rate meant a corresponding decrease in the effectiveness of his available force. This increasing noneffective rate was diminishing the effectiveness of his force just as though his total fighter strength had been reduced each month.

Having satisfied himself on the content and meaning of the chart, the General called the A-3.

"Broadside, have you seen this data on the noneffective rate in our command last month?"

"Yes, General, I have. The charts came into my office this morning."

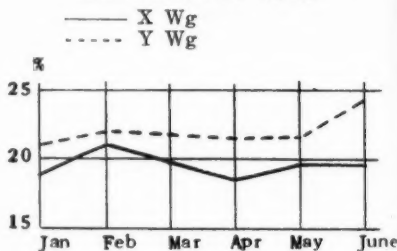
¹ One noneffective combat sortie results when one aircraft which started on a combat mission fails to accomplish the mission on which it started. These noneffective combat sorties are frequently referred to as "abortives."

"Have you any ideas on the reason for the high rate in 'Y' Wing?"

"Sir, I have talked it over with several of the staff and we can't seem to arrive at any common answer. I have already called on the Statistical Officer to make a further statistical study, so that we can have an analysis of the noneffective sorties in both wings by cause and by type of fighter plane. Bailey says he can have the data in my office this afternoon."

"Fine, I shall be interested in seeing what

ABORTIVE FIGHTER SORTIES AS
PERCENT OF FIGHTERS DISPATCHED
EACH MONTH BY WINGS



the figures show. We must get at the trouble soon. We ought to have as near to 100 percent return on our investment as possible, particularly next month. By the way, you might tell Bailey to include an analysis of abortives in each of the wings by the type of mission being flown."

"I'll do that, General. He probably is working on it now; because he said he would cover the picture from every angle. I think we will be able to locate the trouble as soon as we get Bailey's analysis this afternoon."

The General expressed agreement. We will leave this discussion as the A-3 brings up another subject with the General.

The discussion just completed is only one of many possible examples of the use being made today of the statistical information provided by the AAF's statistical control system. The particular example used illus-

brates the use of this information for control purposes. By this, we mean having accurate information on all phases of our own activities and, by means of this information, exercising command control to improve the efficiency of the command. How statistical control operates to do this job we shall see shortly.

For a moment let us look into the A-1's office at this same headquarters. Lieutenant Colonel Percy Knell, the A-1, is studying a combat crew loss and replacement problem in preparation for a staff conference to be held next week in the chief of staff's office. The staff is working on plans for operation "Blast," a phase of operations to take place in six weeks. Colonel Knell has been given an outline of the principal features of this plan and has been directed to study the feasibility of the plan from the standpoint of the availability of combat crew replacements to cover anticipated losses.

Colonel Knell has obtained from A-3 the sortie effort by type plane, that is required to accomplish the mission outlined in the plan.

Colonel Knell must estimate the combat losses in crews that will result from the number and type of sorties indicated by the A-3. After some preliminary consideration of the problem, the A-1 decides to see Captain Bailey, the Statistical Officer.

"Bailey, you're probably already familiar with the 'Blast' operation. I already have in my files a great deal of very helpful statistical information on crew attrition rates for our past combat operations. However, I need more information—specifically, with regard to our experience on fighter crew losses from escort missions going into this particular enemy area. This 'Blast' operation calls for a high proportion of our fighter sortie effort to be devoted to these escort missions. Since the rate of crew losses on these particular escort missions has been higher than on the types of missions we have recently been flying, I am going to require some special dope on them, so that my estimate of crew losses will be adequate. Can you give me all your data on these loss rates?"

"Sure can, Colonel. I believe it would be a

good idea to supplement the data that I can develop from our own combat experience with some information on the experience of some of the other commands in this theater on this same type of mission. I can get that dope from the statistical control unit at air force headquarters. I'll try to have the complete data for you in two or three days."

"Check—but let me have the figures on our own experience as soon as you can."

Colonel Knell then went back to his office and commenced working on his crew loss estimates, using the data on past combat operations already available to him, as a guide.

In this example we find the AAF statistical control system put to use by commanders and staffs in planning operations. It is a familiar and well-recognized fact that the planning of operations depends to a great degree on the proper application of past combat experience. Statistical control data is particularly fitted to meet this need at all air headquarters.

At this point, the reader may very well be anxious for more light on the AAF statistical control system and how it differs from statistical service as applied in the other components of the army.

The principal point of difference between this system of statistical service and that found in the rest of the army is that, in the air forces, statistical service has been integrated at each headquarters² and then organized as a system running through each echelon of command. This results in canalizing and integrating the flow of data. The following four characteristics of the air forces statistical control system are listed, in order to emphasize these differences:

1. All statistical functions in each air force headquarters above the squadron have been centralized in one office which exercises statistical control.
2. This statistical office or section is placed under the direct control of the commander or his chief of staff to insure that the proper functions of statistical control are achieved.
3. General and special staff sections are re-

² The lowest echelon of command with which statistical control is normally associated, is the group.

lieved of the necessity of processing reports and preparing statistics.

4. Specially trained officer personnel are provided to operate all statistical offices or sections.

Whatever doubts there may have existed at first as to the necessity or desirability of departing from established army practice and of setting up an integrated system of statistical offices in the air forces can now be considered a memory. Actual experience with the system both at home and abroad has demonstrated its great value to commanders and staffs. Statistical offices are now a standard and essential part of each headquarters organization in the air forces.

Statistical control is organized with one statistical control unit (SCU) at air force headquarters and one or more statistical officers at air command or division, wing, and group headquarters.² The statistical control unit is charged with establishing the basic statistical control procedures to be applied in that air force, subject to the approval of the air force commander. Statistical officers at lower echelons are provided primarily to furnish statistical service to the headquarters to which attached. However, these officers also operate to assist in the fulfillment of the program and system prescribed by the SCU at air force headquarters. This assistance is achieved by having each echelon exercise technical supervision over the work of the next lower echelon.

Statistical control at all echelons is a service. It does not exercise any command or staff functions.

Let us now observe an SCU at work. Its reason for existence is primarily statistical service. Hence the SCU must determine the need for data and information of each of the numerous offices at the air force headquarters. It is the staff's responsibility to keep the SCU advised at all times of exactly what infor-

mation or data should be available at the headquarters to assist the staff in headquarters control and planning. It is then the SCU's job to translate these needs for data into a reporting system. The relationship of the staff and the SCU in this aspect is one of consumer and retailer or distributor.

It is in connection with the establishment of a reporting system, or may we say a system of reports, that the SCU proves of great value. With one single agency at headquarters bearing the responsibility, it is possible to achieve maximum economy in the number and types of reports that reporting organizations will be required to prepare. In the past, as we all know, squadrons, in their almost exclusive role as reporting units, have been swamped with calls for reports from higher headquarters. Since statistical officers are not normally assigned to squadrons, the burden of preparing reports always fell on squadron administrative personnel. In the absence of a single agency at higher headquarters charged with maintaining and coordinating all reports, squadrons were required to prepare numerous duplicative and unnecessary reports. Proper squadron administration in the air forces suffered as a result.

Under the statistical control system, responsibility for establishing reports and reporting procedures was centralized in the statistical office at the air force headquarters. This was a great forward step in the development of improved organizational structures in the air forces. Moreover, it constituted a positive measure taken to provide relief to squadrons from the paralyzing flood of calls from higher headquarters for reports.

Having set up the machinery for reporting, the SCU's next major responsibility involves the processing of all the information conveyed by the reports coming into the headquarters. It is here that the valuable special training⁴ received by the statistical officers is most strikingly evident.

² The organization given has purposely been restricted to that found in an overseas air force. However, mention should be made of the Statistical Control Division at Headquarters, AAF, which operates to coordinate and supervise statistical control activities in all the air forces.

⁴ AF statistical officers are trained at the AAF Statistical School which has been operated at the Harvard University Graduate School of Business Administration. Students at this school are officer candidates specially selected from among the students at the AAF Officer Candidate School.

Reports are processed rapidly and accurately, using the latest and best techniques. Moreover, presentation of statistical data to commanders and staffs has been greatly improved by an effective use of graphic representation. Graphs in various forms, as prepared by the SCU, permit commanders and staffs to obtain, with a minimum of time and effort, an accurate understanding of the conditions reported in the graph. Air force staff and operational reports today frequently consist of a series of well-developed and correlated graphic presentations produced by the SCU.

In addition to converting the data furnished by current reports into easily readable form, the SCU has officer personnel specially trained in the making of analyses and studies. Hence the SCU is ready at all times to provide the commander and staff with such analyses or studies as the latter may desire. Not infrequently, SCU's recommend to interested agencies in the headquarters the possible value of conducting a statistical analysis or study on some particular phase of the command's activities. Because of its close association with the data developed from operational and other reports, the SCU is in a position to make these recommendations.

One further aspect of the SCU, which should not be overlooked, is its capacity in the air force headquarters to act as the primary source of all statistical data. In order to utilize the capabilities of the SCU, the staff must learn to go to the SCU for statistical data and not direct to the lower units. Only in this way can lower units be spared from preparing special reports calling for information *already* available at SCU from standard reports. It is normally the function of the chief of staff to see that the principles of statistical control are applied. The SCU should be the headquarters information center or clearing-house for all statistical data. Moreover, the SCU will often disseminate, to lower echelons, summaries of information which may be useful to the lower headquarters.

In the command echelons below the air force headquarters, the statistical officers operate to provide the same service to their headquarters as the SCU provides to the air

force headquarters. With regard to the reporting system established by the SCU, the statistical officers in lower echelons check the accuracy of reports, supervise and assist in their preparation, and act to expedite their forwarding.

Information required by a lower headquarters which cannot be extracted from the SCU reports processed through that headquarters may be obtained by requiring additional information on current SCU reports or by prescribing additional reports. The statistical officer at the lower headquarters will recommend to his chief of staff the method to be followed. However, all such additional reports are surveyed by the SCU to insure that efficiency, in the overall reporting system, is maintained. It should not be overlooked that many of the needs of lower headquarters for additional data can be obtained from statistical sections at higher headquarters. Thus we see a downward flow of processed data accompanying the upward flow of both unprocessed and processed data.

These, in general, are the principal features of the organization for and the functioning of statistical control in combat air forces. The two scenes at the beginning of this article are intended to illustrate the two principal uses made of statistical control by commanders and staffs: (a) for control, and (b) for planning. It is not possible, in the limited scope of this article, to continue the two opening scenes and give a step by step example of how Captain Bailey, the Statistical Officer, proceeded in obtaining the information called for. You may be sure, however, that all of the information was provided, since the necessary data would be available to the Statistical Officer in the statistical reports on file in his office.

As a system, statistical control started operating in the Army Air Forces shortly after Pearl Harbor. At its inception and for a while thereafter, the system was received by some as an unnecessary and undesirable innovation. Today it is *functioning* successfully in all our air forces. Our best known combat air force commanders have paid re-

peated tribute to the important contributions made by statistical control in putting headquarters operations on a factual basis. Statistical control makes accurate up-to-the-minute information available in the planning of many operations which probably could not even be attempted without such data. Finally,

it should be emphasized that a considerable part of the credit due for the success of statistical control belongs to the statistical officers themselves. Their efficiency and the high standard of their work have demonstrated, in actual practice, the soundness of the system as conceived by its originators.

Re-Tire in Time!

Released by the Director, Maintenance Division, Army Service Forces.

THE acrobat's life depends on "timing." So does the life of a tire. And the comparison isn't so insignificant as it might seem at first glance, for the success of our armies depends in large degree upon the use of rubber-tired equipment. Our stocks of combat tires can be maintained only by making *all* tires yield the fullest service of which they are capable, so that tire production facilities are kept as much as possible from being overburdened.

An important factor in maintaining the tire supply is putting new treads on tires, and that's where "timing" becomes so vital. For, in order to conserve manpower and save precious time, it is essential that tires be sent in for new treads *at the right time*—neither too soon nor too late. This necessity is yet to be fully realized in the Army.

Reports from the field indicate that at present many of the tires which are sent in to the tire collection centers for new treads are removed from service *too soon*. A tire can, and should, be used as long as the tread is still raised slightly near the center. Any tires in this category which are sent in to the tire collection centers must be returned to the field and reinstalled. Thus, all of the handling necessary for sending them in, inspecting and classifying them, and returning them to service, becomes wasted motion and effort. It puts an unnecessary strain on the already overburdened collection centers. Only when the treads wear smooth in the center are tires ready for a "face-lifting" job.

The number of tires which are removed

from vehicles too late, when the rubber has worn down to the cord body of the tires, also represents a serious condition, since the scarcity of tire carcasses is a more important factor in the present task of supplying tires than the scarcity of rubber for new treads. This is due not only to the shortage of manpower, but also to the fact that synthetic rubber is far less satisfactory for use in construction of heavy truck tire casings than it is for use in new treads. The natural rubber casing dissipates heat and withstands far more abuse than the synthetic one. Therefore, it is extremely important that casings, many of which still contain natural rubber, be preserved to the maximum degree. For the natural rubber shortage is a very real one.

Responsible personnel must become increasingly conscious of this condition and take the necessary steps to overcome it. Inspections must be regular and thorough. The practice of rotating tires to different wheel positions when treads cup, or wear irregularly, must be followed. Irregular wear on front tires may be due to improper wheel alignment—this should be checked and corrected. When cuts expose tire cords, tires must be removed immediately and sent in for reconditioning.

In almost every military situation success depends to a large extent on acting at the right time. "Too soon" and "too late" aren't good enough. So it is with the process of putting new treads on tires, for though this is only one phase of preventive tire maintenance, it is an extremely important one. We must "re-tire in time"—the *right* time!

Chemical Warfare in the European Theater of Operations

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WILL the Germans dare use poison gas against the Allies during the invasion? That was a very vital question all through the invasion planning period. The estimates and appraisals made by all sources were extremely indefinite and usually ended up with from three to six probabilities, each one of which was as possible as the other. These estimates reminded me very much of those written by students at the Command and General Staff School, and which normally received "U" [unsatisfactory] rating. However, in actual warfare it is difficult to hand "U" to anyone until after the war is over. It is normal to go along on uncertainty and just hope for the best.

But this chemical estimate was very difficult for many reasons: First, the Americans had never made any international agreement or any international statement that would prohibit them in any way from using any or all chemicals in warfare. The British, on the other hand, and the Germans had a sort of agreement made at Geneva in 1925, in which they had decided not to use chemicals. In this agreement there was very definite verbiage regarding all gases, and even references to the difference between the employment of white phosphorus as a smoke producer and/or as an antipersonnel agent. Second, the British and American Air Forces estimates stated the Allies had air superiority over France but they did not yet have air supremacy and that everything indicated the Germans could mass some 1,500 to 2,000 planes over and above those in operation during April and May. It is easily seen from this that the Germans could have used gas if they desired. Also, numerous offensive gas supplies were located all over France.

Amphibious operations on any shore are difficult. Troops landing in the first four or five days must go in with the very lightest impedimenta. The tonnage that can be landed after those days must be carefully screened

and every ounce of it must be balanced. To give adequate chemical defense protection to troops demands considerable tonnage. Assault units must carry gas masks and be burdened with impregnated clothing. Decontaminating troops and general decontaminating equipment must be provided. The decision was a difficult one, and a great many of the troops themselves, particularly airborne, requested permission to reduce protective measures to a minimum; but permission was refused.

After a study on all sides of the question and an analysis of all ramifications of estimates from Air, Navy, and Army, both British and American, it was decided to take no chances during the beachhead period. From that point on, the gas operation phase was simple.

Since gas was not introduced by the Germans during this period, perhaps some people will say now that we overburdened the troops, yet the latest data coming in from German prisoners and recent studies on German equipment and orders indicate very clearly that the Germans were more frightened of the Americans using gas than were the Allies of German use; therefore, the Germans were more burdened with their own gas defense preparations. Long before D-day the Germans had intensified all chemical protective measures. They had run special gas schools, issued a special FE-42 gas mask filter, and held numerous practice alerts throughout all organizations. To keep the enemy tensed over a situation of this kind is a big factor in combat morale, and in our analysis of this gas situation we must not lose sight of such a factor. Now that the Normandy operation is over, it is still believed that the methods followed were the logical ones.

CHEMICAL COMBAT BATTALIONS

There is a long story connected with the operation of the chemical combat battalions,

equipped with the 4.2-inch mortars. Very little of the true story can yet be written concerning their past history, as in the light of present events it would be too critical. However, it can be said that the War Department never realized the value of the mortar and so did not produce one quarter of the battalions demanded by the fighting divisions. In reading the story of the operations of these battalions this fact must be borne in mind, because, due to the great shortage of battalions, corps and division commanders were forced to employ these battalions in a manner not suitable to their Tables of Organization and Equipment. There were only a few chemical combat battalions in the United Kingdom on D-day, and in spite of demand and pressure, no more are in action on D plus one hundred.

Most military people are familiar with the 4.2-inch chemical mortar, but since it has undergone some changes, a few of its general characteristics will be mentioned here. A real description can be obtained from the Field Manuals.

The mortar fires a 25-pound shell which becomes rotated in the process of firing through the rifled barrel. Its book range is given approximately as 580 to 4,250 yards, but from the practical standpoint its battle range varies from these limits.

Its total weight is 300 pounds, and normally it is transported in handcarts which, in turn, are carried in jeep trailers. From the cart it can be emplaced and the first accurate shot fired in an average of eight minutes. Naturally, good crews with ideal terrain can reduce this time by fifty percent. Its greatest value is its accuracy and the terrific masses of fire it can place on a target in a short space of time. It is this weight plus time factor of destruction on a target which keeps it in such great demand.

The General Staff and all War Department publications intended the chemical battalions to function as battalions, allotting companies to operate with separate elements within a division. The Tables of Organization and Equipment were drawn up with this procedure in mind, but that was all theory, and in practice the Tables of Organization and

Equipment and the Manuals of Technique of Procedures became useless and had to be discarded, as the reader will note in later explanation. A study of all available reports and observations does not reveal one example of the employment as visualized, and that covers all theaters; South Pacific, Sicily, Italy, and now France. There were not sufficient battalions to meet the demand, so these battalions were often parceled out a company to a division, and in turn the company was broken up into platoons operating alone. Under such methods the strength was never adequate to mount twelve mortars as prescribed, so each company was reduced to eight. In Sicily and Italy the battalions operated generally as a unit, but were forced to establish rest companies in rear areas to afford some rotation for exhausted crews.

These deficiencies were basically noted and reported repeatedly by the Chemical Warfare Service, but no changes could be made to meet the practical demand efficiently. Battalions are still operating under strength and broken up in all theaters. Also, their strength only permits the use of eight guns per company instead of twelve as prescribed.

In the preliminary plan for invasion, the assault divisions requested a number of battalions for the American sector alone, approximately one battalion supporting each of the divisions, but that many were not available in the United Kingdom for this work. Those available were sent to a training center for training in assault warfare. They were to fire both smoke and high explosives and to handle certain preliminary work with floating smoke pots en route to the beach. The phasing-in of their landings ranged all the way from the eleventh wave to any time after D plus two days. This approximated the ideas developed in tests in the United States at Norfolk, Virginia, where assault divisions usually rushed in their entire field artillery in early waves. However, based on British experience, it was decided that the field artillery were not to be included in the early waves, so when the plan was finally executed, the chemical battalions available for assault divisions were sent with approxi-

mately the fifth and seventh waves on the first day, and they landed as complete units in those waves. The artillery was phased back, and the mortars operated for many hours as the only beach artillery available for supporting the attacking infantry (see Figure 1).

Due to the under-strength Tables of Organization, the units were not able to operate as prescribed by War Department doctrine. Even by attaching a chemical impregnating

porting the westernmost flank of one beach fired a vast quantity of white phosphorus for both smoke screens and casualty effect. Also, one platoon on the far eastern flank fired considerable smoke to screen that flank from enemy shore batteries registering on the division from a promontory far out at sea.

After the beachhead was secured and operations became normal, each battalion was assembled for a day in an effort to reorganize so as to give the infantry the sup-



FIGURE 1.

CHEMICAL BATTALION FIRING 4.2-INCH MORTAR AT GERMAN PILLBOXES DEFENDING BEACHES IN CHERBOURG PENINSULA, 10 JUNE 1944.

company of 135 men to each battalion, the unit was still too far under strength to operate more than eight guns of the twelve guns authorized. In conversation with division commanders and with combat team commanders afterwards, they very definitely admitted the loss felt by eliminating a platoon of four mortars. All admitted they could very efficiently have employed them and speeded up the operations and reduced casualties.

During these early actions to secure the beachhead, ammunition expenditure reports from both battalions indicated that very little smoke was fired; yet one company sup-

port of twelve-gun companies as contemplated in theory, but this again appeared impossible even with the attached 135 men in addition to their authorized strength. The ammunition consumption was tremendous and the movement of the equipment, without adequate transportation, was difficult. Immediately after this reorganization lull, two companies were loaned to the — Airborne Division to supplement their pack artillery. Later on, their own guns were relocated and reformed, and eventually it was possible to release the two chemical companies for further action with their own division.

As the battle went on, more and more demands were made on the mortar battalions. In the advance on Cherbourg, the two battalions that had landed on D-day were scattered as individual companies assigned to support separate divisions. This made operations extremely difficult and communication from battalion headquarters absolutely impossible. Most companies had to go ahead on their own with very limited facilities. Investigation by personal contact with the individual company commanders reveals the fact that at no time were company units given a target which they were unable to engage because of lack of ammunition. In such rapid action this is quite an accomplishment. A great deal of the credit for keeping this ammunition supply up to the troops rests with the attached chemical impregnating companies which had been improvised into ammunition platoons for each separate company. During this action, the reports show expenditures of approximately eighty percent high explosives and twenty percent white phosphorus. The over-all picture on ammunition expenditures for twenty days gives seventy percent high explosives and thirty percent white phosphorus. In this operation as well as in later operations down through the Brittany Peninsula, the mortars could completely blanket a hedgerow corner by dropping high explosive and white phosphorus on both sides of the hedgerow and into ditches, leaving no place for the enemy to hide. The artillery, on the other hand, to attack such a target with its flat trajectory, would have to blast the hedgerow hummock and the ditches flat before they could drive the enemy from such cover. It is readily admitted that white phosphorus will not produce a high percentage of casualties, but it has an important antimorale effect and it does spray over a terrifically large area and thus covers more of the target than would be possible with high explosives. White phosphorus fired in this manner, in small doses, will rarely create sufficient smoke to interfere with infantry operations. Commanders and observers report that smoke did at times interfere with artillery observers

and did disrupt small-arms fire of well-advanced infantry, but generally this resulted from an effort to build up a screen with the wrong wind direction. A study of the ammunition expenditures and specific missions indicates that incidents of damaging smoke screens were quite rare.

There was never any great demand for large smoke screens, or for screens to be maintained for any length of time, but repeated calls were made for small and quick blinding missions. In one case, two companies put down a covering smoke screen for eleven hours to hide and protect a large deceptive troop movement from observed enemy fire. There were a number of such large and long-time missions fired in Sicily and Italy, particularly at the Anzio beachhead and at Salerno. But such procedures were rarely needed in France. When covering screens were used, it was found that only a slight haze was required to produce the full effect. The ammunition expended in the eleven-hour screen mentioned above was only about fifty percent of the theoretical book computations. Of course, terrain and weather helped.

The demand for smoke was usually just to blind enemy observation for short periods. Smoke used that way rarely interfered with our own infantry, yet there are reports from infantry cursing the haphazard large screens which drift all over. A personal examination of the area covered in one report indicates that only a small quantity was fired, but weather, coupled with a valley and foliage, held the smoke down for a long time. Isolated cases like that will happen, but in the long run great benefit can be derived by the infantry from smoke. They must also take some adverse conditions as a balance. The smoke fire plan is generally coordinated with the infantry units downwind, and this should obviate most of the difficulties.

There are two schools of thought as to how these battalions should be employed: (a) as direct support of infantry keeping the contact direct between the chemical unit and the regimental combat team commander; (b) as artillery under the control of artillery and tied-in with the fire direction center. There are

other schemes as well as many ramifications to these two schemes, but basically they are divided into the two methods mentioned above. Experience has proved to all but one of the seven battalion commanders personally contacted that method (a) is the better one if released to tie in with artillery shoots when required. Under scheme (a), which is direct support of infantry, the gun positions should never be farther forward than 700 yards to rear of the assaulting infantry platoons and

could get forward observation almost at any time, and their communications from observers to guns were direct and generally short. The guns, if located in forward areas, as specified above, would have been in a dangerous location, as the enemy, who was on higher ground, could look "down their throats," so to speak. So in that terrain the mortar positions had to be farther back and the observers closer in than specified as normal. In France, however, the terrain was



FIGURE 2.

BRITISH "CROCODILE" FLAME THROWER FITTED TO A CHURCHILL TANK. THE FUEL IS CARRIED IN AN ARMORED TRAILER TOWED BY THE TANK. (BRITISH OFFICIAL PHOTOGRAPH.)

should rarely be farther back than 1,500 yards. This places them, generally, in the area occupied by the infantry support battalions of regimental combat teams. Naturally, factors such as infantry formations, terrain, weather conditions, lines of communication for observers, etc., all affect these distances, and examples will show them exceeded at special times.

The utilizing of firing observers was another very debatable point. In Sicily and Italy the mortar battalions showed that they

very flat and forward observations were practically impossible. Map firing was the rule rather than the exception. A great number of forward observers were killed in the early phases, and the reports kept coming in that it was a waste of good manpower since they were never able to observe anything and were merely out there to be shot up. However, as the movement became more rapid and the enemy artillery intensity decreased, the forward observers very often caught the enemy in large numbers in gen-

eral localities and called for heavy area mortar fire and thus executed terrific destructions. The method paid big dividends in such cases. Personal conversations with observers who were decorated for their work along this line leaves one with the impression that the tactical situation itself must decide when forward observers should be used or when it is better to fire on map fire or merely fire on specific terrain features which may logically house enemy installations. The reader must remember that there is considerable difference between the working of forward observers to indicate enemy targets to be engaged and the use of observers to adjust fire. The mortar battalions should always have some observers to adjust fire even if it is map fire or fire on specific terrain features. With the white phosphorus shell, such fire adjustment by observers is a fairly simple matter.

One chemical battalion played an important part in the beachhead fighting and later in the St. Malo and Brest actions. Company B was sunk during the crossing and lost all equipment and some men. It was refitted in the United Kingdom and sent back in time to get in the St. Malo action. Up to the completion of that action this battalion had supported seven different divisions. The battalion commander reported great success with the air-ground system. When an infantry commander had air help, the mortars fired white phosphorus on a line or in a box on a specific enemy area, and by expending a few shells could keep up that very distinct and accurate marker until the air could get over it.

St. Malo was an interesting operation to all over here. Note the following extracts (extracts but not a quotation) from a translation of the document sent the mad Colonel by Hitler, and see his reactions:

Your troops are fighting a heroic battle and are regarded with the deepest respect. I express my highest esteem to you and your soldiers. Every day you hold out is a day won in the battle against the aggressors. Don't waver as long as there is a

bullet left in St. Malo. Long live Greater Germany.—Adolf Hitler.

The Colonel issued a memo to his troops:

We have sworn loyalty to the Führer until death. The world looks at us; we must continue our duty. Long live the Führer.

Then later on the 17th of August, the Colonel issued a memo which stated that all his weapons were disabled and that with a heavy heart he had decided to surrender the citadel. He further stated in his document:

... in continuing we must face material superiority and realize that the enemy can easily destroy most of us by *phosphorus* and *smoke*. We have fulfilled the difficult task the Führer has given us in fourteen days of heavy fighting. We have tied up enemy troops and permitted the relief of our comrades in Normandy. When the time comes, every one will be in faultless attire and leave the position with accustomed military discipline. Show to the last man that you are soldiers and that any statement you may make may cost the lives of hundreds of comrades. I thank you for your efforts and hope you may soon rejoin your families at home in good health. I will give the order over the telephone to show the white flag; until that time, fighting will continue with the same vigor. Long live the Führer. Long live our beautiful Fatherland.

With action moving so rapidly now (4 September), the chemical battalions are not being used except where centers of resistance are holding out.

There were finally six chemical combat battalions working in Italy. Their greatest value was obtained at Salerno and at the Anzio beachhead. In general, the method of employment was as already described, except that they were more often held together as battalions, and the gun positions were deeper, that is, back on the front fringe of artillery emplacement areas about 1,200 to 1,500 yards. In Italy, there was also a greater use of smoke screens. The reports from Italy, and ammunition expenditures, show that HC

smoke was considered as a useless munition, whereas WP was in great demand. This same sort of report was sent in by artillery in their use of smoke shell. The artillery in France and Italy report no use for HC and they only fire such shells after the last WP shell has been expended.

SMOKE COMPANIES

Great preparations were made prior to D-day for large-scale smoke screens to cover

beach areas, and two of those actions were to cover visiting ships carrying important personages. Air bombardment at Cherbourg never took place, and so after two weeks in that area the smoke generator companies were moved forward. Some are still being held for work around Brest, but it is felt that even these will not be needed. The front is so fluid that these companies are not utilized in present operations for ground



FIGURE 3.

BRITISH "WASE" FLAME THROWER IN OPERATION ON AN ASSAULT COURSE. (BRITISH OFFICIAL PHOTOGRAPH.)

the marshalling areas, embarkation points, and landing beaches, and later for setting up smoke systems for covering harbors such as Cherbourg and Brest. But the enemy did not come through with the intensive air bombardment expected in the G-2 estimates. It seemed apparent that the Allies not only had the so-called air superiority but had complete supremacy across the Channel. The bad weather destroyed the artificial breakwater and engineer installations at the beaches, etc., and enemy bombing was rarely worth while, so smoke was not required. Present reports state smoke from trawlers and from land generators was only utilized five times in

smokes, but a demand may be made when resistance areas are met.

The conditions were different in the Mediterranean theater. There, a great amount of antiaircraft smoke screening was demanded. These large screens have been written up many times before and will not be explained in detail here. The method of employment of such companies for ground smoke may have some interest, and two operations, (a) in the Anzio beachhead and (b) on Highway No. 6 during the assault on Cassino, will be explained. In both of these places the assaulting troops were under constant observation from German observation posts located with-

in 500 to 1,000 yards up the mountainside. These observation posts were constantly able to bring accurate artillery fire to bear on all bottlenecks such as bridges, crossroads, and mountain passes. They were also quickly able to locate troop concentrations and the forming up of motor transport columns. At Anzio, German artillery fire constantly interfered with shipping movement in the anchorages. Smoke was an essential weapon in such situations. In the movement of supplies to Anzio, smoke matériels were given a No. 3 priority along with rations and medicines.

In this Anzio situation, the smoke companies with mechanical generators and smoke candles were distributed well forward to the windward in a thin fringe. They constantly maintained a smoke haze throughout the area. Many observers traveling through the area remarked on the peculiar heavy fog that was forever present. This fog was really the chemical smoke put down by the Army mechanical generators and backed up to a considerable extent by the Navy Besler generators. In addition to these mechanical generators, one report shows that more than 1,000 British No. 24 smoke pots were used each day over a period of seven weeks. These pots are used only as "fill-ins" for the smoke screen created by the mechanical smoke producers. The smoke frontage over which these units operated extended about eleven miles, but that was not a complete line as terrain disrupted spaceage to a great extent.

FLAME THROWERS

Flame throwers were only used a few times in the Sicilian and Italian campaigns. The use was generally to burn down cover such as wheat and corn fields, and thus expose the hidden enemy machine gunners. They were not used to any great extent for the street fighting except in one case at Cassino. Here there was a great demand for a vehicle flame thrower which would have been invaluable in cleaning up the resistance areas. The portable flame thrower was used a little in this type of work but proved to be too dangerous for the carrier. The flame-thrower operator could not be covered with

protecting fire in his approach, and thus never got within striking distance of his target. There was a considerable difference in the Cassino situation from that encountered at Cherbourg and other city areas. Ever since Cassino, there has been a great demand, both from the British and from the American armored units, for vehicle flame throwers. In the early operations in Normandy, the Crocodile flame thrower was used (see Figure 2). This is a standard British tank drawing an armored trailer which carries large fuel tanks and pressure tanks. Pipes carry the fuel and pressure from the trailer into the tank and up to a bow flame gun. The flame stream shot out is tremendous, and it can continue operation for a long period of time due to the vast quantity of fuel carried in the trailer. Its effective battle range is about one hundred yards. This Crocodile did very efficient fighting for a time in Normandy, but it eventually proved to be too difficult to maneuver. In street fighting in one case it was stopped by long-range artillery fire and, in trying to back out and get under cover, the trailer jammed and the tank and crew were lost. In another case, when it was doing its very finest work it got jammed in trying to go down one of the narrow streets to engage a target and was so fixed in position that it was eventually destroyed. Another reported difficulty was the fact that they could not hold these combat tanks in reserve merely to drag the flame-thrower trailer when that type of operation became desirable, so these specially fitted tanks were sent into action as tanks. Later, when they were sent back to pick up the trailer and go into flame-thrower action, it was found that their flame-thrower piping was all destroyed and so they were out of action as flame throwers.

The British and Canadians had many Wasp flame throwers (see Figure 3). The Wasp has a gun similar to the Crocodile but with a smaller nozzle. There are many different size fuel tanks and pressures, etc., but in general, it carries about 150 gallons of fuel and, like the Crocodile, it will shoot about one hundred yards, but with less heavy im-

fact than that of the Crocodile. The British for a long time gave up the Wasp because the Bren carrier itself did not afford any protection; however, at the present writing the Wasp is considered superior to the Crocodile for the type of action now encountered. The Wasp flame thrower is utilized for burning out wheat fields, spraying orchards ahead of the infantry, and also for the standard street fighting, to burn out small resistance groups in cellars and attics. The Wasp can hide around a street corner and spray its unignited fuel down the street, splashing it against the sides of houses. Another Wasp can operate on the opposite side and do likewise. When the street is well soaked, the

last few bursts can send in the flame and ignite the entire oil-soaked area. This is merely following the system tried earlier with the portable flame thrower at Cherbourg. Many of the portable flame throwers have moved up to the Brest area and a call has been put in for the loan of Wasps from the British.

The above gives an up-to-the-minute summation of the combat operations of the Chemical Warfare Service in the European theater. The Chemical Warfare Service will continue its important mission with its combat functions of smoke, high explosives, and incendiaries.

The Value of Infiltration

Digested at the Command and General Staff School from an article by Major General F. I. S. Tucker, Commander, 4th Indian Division, in *Aim*, army magazine of the British Middle East Command.

THE highest form of offensive operation that infantry can achieve is the infiltration attack, either silently or with artillery support. This operation can only be achieved by an infantry that has been properly trained in patrolling.

Patrolling, then, is the basis of the highest infantry tactics. The higher developments of patrolling are raiding and Commando work, of which all infantry should be capable.

At Wadi Akarit in early April 1943, it seemed impossible to get into the precipitous Zouai Hills held by the enemy. Perhaps the Germans thought so too. But a patrol of the 2d Gurkhas worked into the position and found a gap in the enemy defenses and a way up the precipice that led into the heart of the position, and so to the tops of the dominating hills. On a dark night the battalion quietly slipped through this gap company by

company, the platoons working outwards to right and left *inside* the position: by 0200 hours they had got those dominating hills and were killing everything they could find. The Sussex men passed through the gaps the Gurkhas had now made and worked out still wider to the north and, with a series of sharp assaults, seized the vital heights to protect the flank of the Northumbrian Division. The 16th Punjab Regiment did the same to the south, and by dawn the 7th Indian Brigade had "opened up" the position to over 2,000 yards in depth. Then 5th Indian Brigade, infiltrating boldly through, rapidly secured the whole position. The armor was free to go straight through in its turn.

Thus a prolonged and costly assault against a very heavily defended hill position was turned into a one-night battle solely by infiltration tactics.

All patrols are combat patrols. They must be prepared to fight and be of sufficient strength and adequately armed for this purpose.

—A G-2 of an American division

The Third Phase of the Invasion of France

COLONEL CONRAD H. LANZA

NOTE: This article is based upon the latest information which is available at date of writing and which is not confidential.—THE AUTHOR.

IN two previous articles in this magazine the invasion of France was discussed up to and including 11 August. At that date the situation at the end of the day was that the German army in Normandy, estimated

extending southwards through Avranches. This corridor had been opened by American armor on 31 July. The German attack, after minor initial success, had failed to accomplish its mission.

The corridor having thereby remained open, the 3d U.S. Army had passed through, and after gaining ground to the south had turned east and had reached the line Alençon—Le Mans (both inclusive). Not having been able to break the German line, an enveloping movement by armored and motorized troops had passed south of the German left at Le Mans and then turned north. Passing in rear of the German line, it had aided in the capture of Alençon and then pushed on to Argentan (exclusive). At this point it was in rear of the German line.

In view of this situation, the German commander, after detaching reserves to hold in the vicinity of Argentan, undertook to withdraw east of the line Falaise—Argentan. His army, or the bulk of it, was west of this line, surrounded on three sides, forming a pocket not over fifteen miles wide. Every section of it was therefore open to Allied artillery fire. There were only two good roads leading eastward out of the pocket, one of which ran through Falaise and the other through Argentan. The difficulty of the movement was further increased by the fact that the Allies had overwhelming air superiority, and were using it to bomb and destroy all lines of communication available to the Germans.

The Allies had two army groups. The 12th Army Group (U.S.) included the 3d U.S. Army on the south. The advance on the 11th of an armored corps from Le Mans in rear of the enemy's line to Argentan had opened the possibility of encircling a large section of the German army, provided the movement thus happily commenced could be continued on through Argentan to Falaise. This army group had also the 1st U.S. Army, which was around the west head of the German pocket.

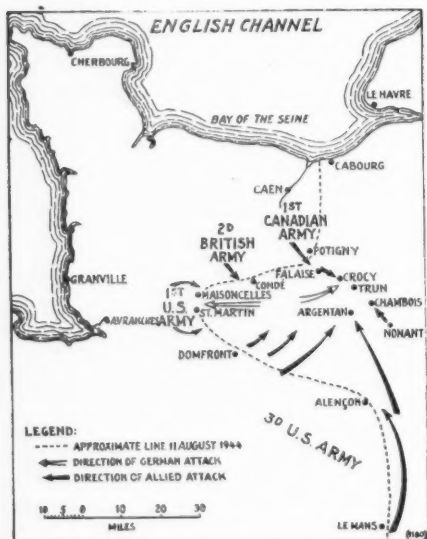


FIGURE 1.

at about twenty-five divisions, held a line approximately as follows (see Figure 1): starting on the coast of Seine Bay near Cabourg; thence to Potigny, five miles from Falaise; thence west and southwest via Condé (German) to Maisoncelles (Allies) and St. Martin (Allies); thence east and southeast past Domfront and Alençon (both Allies); south to Le Mans (Allies). The Germans had just completed an attack by armored troops headed westward from the line Maisoncelles—St. Martin, which had been intended to reach the coast between Granville and Avranches and thereby cut in two the Allied corridor

On the north side of the pocket was the 21st Army Group (British), with the 1st Canadian Army on the east astride the road from Caen to Falaise. Its mission was to advance through Falaise to a junction with the 3d U.S. Army. West of the Canadians was the 2d British Army ranged along the north side of the pocket. Its mission was to join with the 1st U.S. Army in pressing against the sides of the pocket and gradually destroying it.

THE REDUCTION OF THE FALAISE POCKET

Attacks made by the Allies on 12 August all around the pocket had moderate success around the head and very little at the base. On 13 August, orders were issued for a more serious attack to take place next day. The air force was especially charged with unceasingly attacking all possible avenues of escape out of the pocket. The main effort of the attack on the 14th was towards Falaise by the Canadian Army, with a secondary attack on Argentan by the 3d U.S. Army. The latter attack met strong resistance and made no substantial gains. The Canadians attacked with an air preparation starting at 2:00 PM. Four waves of planes at twenty-minute intervals were each to drop 800 tons of bombs on enemy possessions. The infantry, with tanks, was scheduled to jump off at 3:20 PM.

For reasons yet unknown, when the third air wave, scheduled for 2:40 PM, had completed its run, the infantry and tanks opened fire. The fourth air wave at 3:00 PM, observing this, mistook this fire as coming from the enemy, and dropped all bombs on their own lines. This exploded ammunition dumps, trucks, etc., which had been advanced well forward because of the difficulty of moving vehicles over the excessively shelled and bombed terrain. This attack gained but very little.

Such elaborate prepared battles were not renewed. Daily the Allies attacked all around the pocket. The Germans were withdrawing. They were favored by the fact that cross-country movements were practicable. Besides, there were several days and parts of days when it rained or clouds were very low, so

that extensive air operations were impracticable.

On 17 August the Canadians entered Falaise, but the Germans still held Argentan and the road through it. The 3d U.S. Army thereupon shifted the axis of its attack to east of Argentan. Starting from Nonant, this succeeded in joining the Canadians moving south on the line Falaise—Crocy—Trun—Chambois—Nonant, all inclusive. Theoretically, this closed the pocket. By this time all German troops therein had been withdrawn except an estimated 10,000 men. This included some armor. On 20 and 21 August they attacked northeastwards out of the pocket, and encountered a Polish division of the Canadian Army. Some of the Germans got through.

The battle of the Falaise pocket lasted ten days. The Allied bag of prisoners was roughly 15,000. Besides, the enemy had lost important quantities of vehicles, guns, and armor. How many Germans succeeded in withdrawing is not yet known.

A CHANGE IN THE GERMAN STRATEGICAL PLAN

As discussed in previous numbers, following the palace revolution in Germany of 20 July resulting from the attempted assassination of Hitler, a new German chief of staff had been appointed. This individual, Colonel General Guderian, had at once decided to withdraw in France in order to relieve some troops needed to bolster the Russian front.

Very little is known as to the details of the new German plan. The evidence indicates that orders to withdraw completely from France, or nearly so, were issued in the last week of July. At that date it was not considered urgent. The first steps were made in an orderly manner. Field hospitals, depots, noncombat services, civilian employees, and families were started backwards in the last days of July. Except for units sent to Russia, no substantial number of combat units were withdrawn at this time.

During the early days of August, German General Headquarters became aware that the Allies would soon invade south France. To prepare the way for the invasion, the Allies had had communication with the French un-

derground as to routes, coast defenses, location of German troops, and similar necessary information. This was secured and was later found to have been markedly accurate. However, some of the secret agents may have been German counterespionage agents, while others talked too much. The Germans found out about the questions and determined quite accurately when and where the invasion would occur.

The decision was not to oppose the invasion except by delaying actions. The 19th German Army was ordered to fall back, under cover of a rear guard, northwards up the Rhone valley and thence northeast around Switzerland to a line Epinal—Belfort, both inclusive (see Figure 2). Present information is that the movement was initially to withdraw only from the coast, and that the real march northwards would commence only after the Allied invasion occurred. This turned out to be 15 August.

The 1st German Army was in southwest France. Its orders were to withdraw at the same time as the 19th Army, keeping to its west and north. It was to proceed to the line of the Moselle River. Each of these two German armies had six or seven divisions.

In north France was the 7th Army, which was fighting in Normandy, with about twenty-five divisions. Northeast of the Seine River was the 15th Army with fifteen divisions, some of which had been loaned to help out the 7th Army. The 15th Army received orders to withdraw at the proper time and fall back to the line south boundary of Holland to Aachen. The 7th Army was to withdraw parallel to and close to the shore of the Channel, to the line Zeebrugge—Antwerp.

All armies were to provide suitable rear guards to enable the main bodies to reach the new lines expeditiously. They were to leave garrisons as follows:

- 19th Army at Toulon and Marseilles.
- 1st Army at Bordeaux and La Rochelle.
- 7th Army at St. Nazaire, Lorient, and Brest.
- 15th Army at Le Havre, Boulogne, Calais, Cape Gris Nez, and Dunkerque.

Of these detached forces, those of the 7th Army had already been made, and were equivalent to four divisions, of which three were at Brest. Other ports were held by smaller forces. Their total garrisons appear to have amounted to the equivalent of at least four more divisions, making eight in all.

The German High Command has been criticized for ordering these detachments. It is in line with the same policy of holding on to Stalingrad and in North Africa. The German explanation is that if the situation later turns to their advantage so that they can relieve encircled garrisons, the latter will be a powerful factor in a revitalized movement. If they can not be relieved, then the time gained by their resistance is worth the loss of the commands involved. Only access to German records, showing what was accomplished by continual sacrifice of detached garrisons in the way of time gained, will enable this question to be answered.

The invasion of south France came on 15 August. In line with the foregoing policy, the 19th German Army had left only weak detachments near the coast. On the next day, orders appear to have been issued to all armies to withdraw to the German frontier without further delay. This decision seems to have been brought about in part by the bad situation in Normandy. Here the 7th Army was in bad shape from combat losses brought about by the battle of the Falaise pocket.

THE GERMAN RETREAT FROM FRANCE

Each of the four German Armies detailed a suitable rear guard as follows:

7th Army: In present positions on a north and south line east of the line Falaise—Argentan. To withdraw across the Seine River on both sides of Rouen.

15th Army: To provide a rear guard along the Seine between Paris, inclusive, and the left of the 7th Army.

1st Army: To provide a rear and flank guards against French irregulars, and withdraw northeast across country.

19th Army: To retire up the Rhone valley. Rear guard initially to defend the gap in the valley near Montélimar.



FIGURE 2.

SKETCH MAP SHOWING PLACES MENTIONED IN THE TEXT. THE AREA SHOWN IN FIGURE 1 IS INDICATED BY DOTTED LINES.

The German withdrawal on such a grand scale was not immediately noticed by the Allied General Headquarters. It assumed that in the north the Germans would strenuously defend in turn the line of the Seine River; thereafter that of the Somme River; and so on.

On 21 August the two Allied army groups in the north marched forward with a view of occupying the line of the Seine River from Paris to the sea. Paris was occupied by Allied troops on 25 August without much opposition.

The German garrison had been previously attacked for four days by French irregulars and citizens, and surrendered at once when the Allies arrived. The German rear guard of their 15th Army, estimated at three or four divisions, was found just north of Paris. No effort was at once made to overcome it. The main body of the 15th Army had marched away, clearing the area near the coast for their 7th Army.

The 7th Army retired very slowly across the Seine. The crossing of this river was fa-

cilitated by the fact that numerous woods afforded cover close to its banks. After dark, or when air observation was impracticable on account of weather, light bridges were hastily thrown across the Seine, as many as fifteen to twenty being used each night. In this manner the Allies did not succeed in taking the Seine River line until 30 August. This was about a forty-mile advance in ten days.

On the last day of August the 21st Army Group started northeast from the Seine River. In the 12th Army Group, the 1st U.S. Army followed this movement astride of Paris. The 3d U.S. Army went south of Paris, then northeastward toward Sedan.

The most rapid advance was made by the 1st U.S. Army. Its right reached the vicinity of Aachen on 3 September, making an advance of over two hundred miles in four days. There was practically no opposition. The left of this army met the German rear guard. A long fight followed which drifted northwards to the vicinity of Compiègne, where the last of the German resistance was overcome. Another detached force of 10,000 Germans was met near Mons on 3 September. This was overcome in a two-day fight.

On the left of the 1st U.S. Army, the 2d British Army met nothing important. It reached Brussels on 4 September and was near the Dutch border next day. The 1st Canadian Army near the coast had considerable opposition. This German rear guard fought all the way back to the Schelde River, the Canadian Army not reaching the bridgehead south of the Schelde until 15 September.

The 7th U.S. Army, which had landed east of Toulon on 15 August, never came in contact with the German main body. It met the rear guard several times. The latter retired when the tail of the main body was thirty-five to forty-five miles away. It then fell back, moving by bounds, to a new position. The 1st German Army's main body appears to

have withdrawn from southwest France intact. Its rear and flank guards held their last positions near Bourges, and then surrendered about 20,000 men without fighting.

COMMENTS

The withdrawal of German main bodies had been so rapid that the nearly unopposed advance of the Allies for two hundred miles or more all across France led to a general belief that German resistance was at its end, and that the war would be over within perhaps a few days.

Present indications are that the Germans had no intentions of ceasing to fight. The line to which they withdrew is roughly the Schelde River—south border of Holland—west border of Germany to Metz—the Moselle valley—Belfort. When the Allies arrived opposite this line, early attacks failed to break through, and after a month the line is at the beginning of October substantially intact. Part of the Allied difficulties has been in forwarding supplies over a lengthening line of communications. They have been handicapped by having but one port—Cherbourg—at their disposition, and this was only opened for business towards the end of September. To this extent, the German detachments sacrificed to hold ports have produced some result. Just how much, and whether it was really worth while, can not be determined until further reports are available.

The general result of the campaign comes from the success of the two Allied army groups in Normandy. In very hard fighting they defeated the Germans and forced them to withdraw from a very great country. At the beginning of August the Allies outnumbered the Germans by perhaps three to one on the ground, and an estimated twenty-five to one in the air. But they fought well. The undoubted advantage of superior forces does not detract from credit due for work well and bravely done.

All officers must be trained to observe artillery fire and not depend solely on the artillery observers assigned.

—Major General E. N. Harmon

G-3 in Amphibious Operations

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The author participated in the Guadalcanal operations as a battalion executive and in the Tarawa operations as an infantry regimental S-3. He also has participated in numerous landing exercises as company commander, battalion commander, battalion executive, and regimental S-3.—THE EDITOR.

THE amphibious operation has been called the most difficult of all military operations. In perhaps no other form of operation must plans be so thorough and detailed; for, once having started, a landing is an extremely difficult thing to change. G-3 is a central figure in the planning for, and execution of, amphibious operations. His coordination with the other G's and the special staff must be closer, even, than in land operations.

The G-3 can save himself a great deal of grief by establishing an SOP in conjunction with the other members of the staff. The publication of an SOP, well in advance of an operation, allows subordinate units to become thoroughly familiar with the answers to a great many questions which arise during an amphibious move. Changes in the SOP may appear necessary as the planning and execution of the operation progress. The G-3 must be alert to make changes as the necessity for them becomes apparent.

What should the SOP include? In general, all matters which will be standard throughout the unit for which the SOP is written will be included. Such items as the normal composition of combat teams and battalion landing teams (BLT's) for the overseas movement and the assault landing; the standard forms to be used as annexes to BLT orders (boat assignment tables to give the Navy information as to the order and formation of landing troops, debarkation and approach schedules to give the Navy the time factors for landing troops, etc.); and communications nets to be in operation during the landings. In fact, the SOP should in-

clude all matters of cooperation by subordinate units with the Navy. Pertinent extracts from the Transport Doctrine (which is an SOP for transports in amphibious operations) in effect should be included, so that subordinate units will know well in advance what the Navy expects of them. A check-off list showing the duties to be performed and the naval officers to be consulted by troops embarking on a transport will be most helpful.

If the SOP is established well in advance of the operation and an honest effort is made to keep it up to date, most of the last-minute confusion of loading troops aboard a transport can be avoided.

Troops who are to engage in an amphibious operation must have special training for that particular operation. The G-3 must learn from the G-2 at the earliest possible moment the nature of the beach, terrain, enemy resistance expected, and the hydrographic conditions which will prevail in the landing area. Based on this knowledge, the G-3 makes a training program and assigns training objectives which will best prepare the units for the task ahead. This ground training is supplemented by training intended to familiarize the troops with the special problems concerning ships and landing craft. G-3 must make available to the troops training aids such as full-scale models of parts of ships and landing craft, and actual training aboard ship if that is possible.

Probably the most valuable form of training, and certainly the "graduation exercise" for the troops, is the full-dress rehearsal for the operation. A location should be chosen as closely approximating the target area as possible. The landing should be conducted in this rehearsal, using all units, naval, air, and ground, which will actually participate. This is the final mechanical check on the landing plans, and will reveal flaws in such plans as Naval Gunfire Liaison, Air Liaison, and Communications. If possible, all supplies should be landed at this time to test the shore

party set-up. A critique held after the rehearsal will be most helpful to the senior commanders (battalion and up) in seeing that all plans are thoroughly coordinated and that they are physically possible of execution.

Once the units have embarked for transportation to the target area, the training problem becomes acute. The sea voyage from the embarkation point to the target area is usually a long one and entails living aboard ship for a period of weeks. Crowded conditions and the long period aboard ship make it imperative that a well considered training plan for that time be put into effect. The greatest problem is in maintaining the physical efficiency of the men during their stay aboard ship. The cooperation of the Navy must be had to make deck spaces available for regular exercise for the troops. The period at sea is usually well used in acquainting every officer and man with the whole problem of the unit and the personal task of each individual man. Drills must be held regularly to insure the smooth functioning of the debarkation plan.

G-3 is responsible for the preparation of the Naval Gunfire Support Plan for his unit. He must first obtain from G-2 all available intelligence on targets within his landing area. Keeping in mind the amount of naval gunfire support available, G-3 must decide on priorities for targets in the landing area both prior to and after H-hour. G-3 must also plan to provide for a group of ships to be in direct support for "on call" missions. Having made his own plans for the use of naval gunfire, G-3 must get together with his opposite number on the Gunfire Support Group Commander's staff and work out the details. A schedule is drawn up for the times and places for prearranged naval gunfire, and for the location of the "on call" firing ships. Details of the method for requesting and controlling "on call" fires are worked out. The sum total of the Naval Gunfire Support Plan is issued as an annex to the Field Order for the operation.

Air support must be similarly worked out. G-3 must determine his requirements, and in conjunction with his opposite number on the

air staff, he must work out the details for "prearranged" and "on call" missions. The greatest coordination between the Air and Naval Gunfire Support Plans must be worked out in order to obtain the maximum destruction to enemy installations in the target area with the means at hand. If both naval and army air are to be used, the results of the two plans should be combined by G-3 into one annex for his Field Order. G-3 should remember that there is an interval between the time that naval gunfire on the beach itself has to lift and the time that the landing force has its artillery ashore. Provision must be made for the direct support of the ground troops during this time by air bombardment. "On call" aircraft must be on station over the landing area to give direct support to the ground troops. Methods of requesting this air support, marking own lines and designating targets must be worked out in detail and included in the Air Annex.

It should be remembered that G-3 does not order the Navy or air to do certain things, nor does he write the orders for those things to be done. He requests certain missions, takes what he can get, and passes the information on to subordinate units as annexes to the Field Order.

The Field Order for an amphibious operation is apt to draw the comment "too verbose." It is, of necessity, a most complete and detailed document. Since control is initially decentralized on landing, minute instructions to subordinate units are given in order to insure the greatest possible coordination of effort.

Even more detailed than the Field Order itself, are the Annexes. In addition to the Naval Gunfire Support and Air Support Annexes already mentioned, we have an Intelligence Annex which is constantly being revised and brought up to date; an Artillery Annex which coordinates the fires of artillery with naval and air bombardment once the artillery is set up ashore; and a Signal Annex assigning in detail the multitude of radio nets, call signs, and wire communication details which are necessary in the landing.

G-3 must also draw up alternate plans to cover every foreseeable contingency. These plans, and the orders to put them into effect, must be as detailed as the Field Order for the preferred plan itself. Alternate plans must provide not only for the landing of elements of the landing force at points other than those designated in the preferred plan, but must also contemplate the loss en route to the target area of any elements of the landing force.

Finally the landing force has embarked and is sailing to the target area. G-3 must keep the closest contact with G-2 during this period to see whether new intelligence received during the voyage necessitates a change of the preferred plan to one of the alternate plans. D-day arrives and again G-3 must be instantly ready to switch to a new plan if the commanding general so directs. The period of the landing is the most critical time during the amphibious operation. Innumerable things can happen which will cause an emergency change of plans while

the landing is progressing. G-3 must be able instantly to carry out the wishes of the commanding general. Speed in this matter may sometimes be the margin which defeats the enemy. G-3 must constantly have the entire situation at his fingertips so that he may immediately advise the commander of a breakdown of parts of the original plan. G-3 must maintain constant contact with the Navy and the air so that they may be immediately notified of a change in plans or of additional support needed. During this time the G-3 must maintain an outstanding flexibility of mind to cope with the rapidly moving situation until the troops get ashore.

The troops get ashore and establish their beachhead, the commanding general moves his command post ashore, gathers all his units under centralized control, and the normal land operations commence. G-3 can at last breathe a sigh of relief and start applying his staff functioning as taught at Leavenworth.

Robot Nudging

From a British source.

ONE of the methods used by RAF Spitfire pilots to deal with flying bombs was to range alongside them and shoulder them off their course so that they would crash and explode harmlessly on open ground.

This "bomb-nudging" procedure was the impromptu discovery of a pilot who ran out of ammunition after destroying two flying bombs. Deciding to take a chance with the third, he ranged alongside the "diver," delicately slid his starboard wing beneath its port wing, flicked his control column, threw the bomb's gyro mechanism off balance, and sent the machine spinning to the earth.

The pilot promptly reported the success of the maneuver and all fighter stations were informed, but the novelty of the method led to its being rather discouraged and it was not officially sponsored until scientific investiga-

tion proved that at high speed the air cushion between the two machines sufficed to deflect the flying bomb.

Bomb-nudging was not invariably successful because, after the first attempt, the gyro-pilots of the high-flying divers sometimes enabled them to recover balance, compelling the attacking fighters to repeat their dash twice or even three times before achieving their object.

A Mustang pilot accidentally found another road to conquest. Screaming down in a power dive onto a flying bomb, he overshot it and tore ahead. Pulling out of the dive, he saw it splash in the Channel and realized that the slipstream of his aircraft had thrown the bomb out of control, downed and drowned it. This method, too, was added to the list of the killers' recipes.

The Lifeblood of the Infantry Division

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THE vehicles and accompanying personnel which operate primarily in the supply, evacuation, and maintenance of the division are the lifeblood of the infantry division. They secure the "food" from the supply points and deliver it as life-giving energy to that portion of our division organism which requires replenishment. The ability of a division to perform any mission (or even to exist) is dependent upon the efficient operation of its transport and service personnel. It is, therefore, most important that all officers of the division who are concerned with supply or tactics have a thorough knowledge of the basic principles of operation of division transport.

The reason that this matter is not more generally understood is that in practice its operation is carried on in so many different ways that the few basic principles involved are not readily discernible. The purpose of this article is to present these principles clearly and concisely, and also to illustrate graphically how they operate. In so doing, this article may appear to be rather theoretically rigid. However, it should be understood that these are guiding principles which should be applied as the situation dictates.

Before we can discuss its operation, we must understand the organization and functions of the transport and service personnel of the infantry division. The table in Figure 1 indicates the composition and functions of the various trains and other vehicles which are found in the infantry division. The vehicles and service personnel may be divided into three groupings: division trains, unit trains, and company or battery vehicles. It will be noted that each infantry regiment and each field artillery battalion has a unit train which is of sufficient strength to perform practically all the services required to maintain its unit. This is noteworthy, as it places the means of supply in the hands of the interested unit, and one may rest assured that if higher headquarters (usually army) places the supplies within reach, as pre-

scribed by Field Service Regulations, the unit will get them. Another point is that the division trains are made up of technical service personnel who reinforce the services of the unit trains by performing those technical tasks which are beyond the capabilities of the unit trains, though in times of stress the division trains assist the unit trains in their normal functions. The company or battery vehicles have no prescribed supply and evacuation function, but they do assist the various carrying parties in their forwardmost carries.

The schematic diagram, Figure 2, indicates the normal location of these trains with reference to other units of the division (only one regiment and one battery are shown), as well as other data of interest (control, etc). It will be noted that, in addition to our normal grouping (company and battery vehicles, unit trains, and division trains), the unit trains may be subdivided into combat trains and field trains depending on their required availability. The combat trains consist of those sections of the unit trains which are required forward in immediate support of the combat troops. Naturally, the situation determines what specific sections are properly termed combat trains. However, normally we find the ammunition section, maintenance section, and medical section are combat trains. All other sections of the unit trains are known as field trains.

The principles under which these trains operate may be summarized as follows:

1. Supply, evacuation, and maintenance is the primary mission of the trains. Therefore, they must at all times be located close enough to the combat troops (not more than four to six hours round trip travel time) to support them adequately, and if necessary they may have to fight to perform this function.
2. The trains must not interfere with the combat troops in the fighting area, so they must be kept as far to the rear as possible.
3. Unit trains perform practically all the services required of their own unit. Division

COMPOSITION AND FUNCTIONS OF THE INFANTRY DIVISION TRAINS

DESIGNATION	COMPOSITION *	FUNCTION
<i>Div Tns</i>	Vehicles and personnel of organic Serv Units of the Div whose primary duty is Sup, Evac, and Maint	Serves the Div as a whole
<i>QM Tn</i>	3 Trk Plats (16 Trk and Tlr Units [3½-ton] each) 1 Serv Plat (39 laborers)	Transport reserve Sups and foot Trs, vehicle Repl, and emergency Sup Labor pool
<i>Med Tn</i>	3 Coll Cos (10 ambulances each) 1 Clr Co	Evac of casualties from Bn and Regt Aid Stas to Div Clr Sta. Sup of Med Sups Receives casualties and prepares them for Evac by higher Ech
<i>Engr Tn</i>	That portion of the Engr Bn which is engaged in Sup, Evac, and Maint	Procurement and storage of water. Supply of maps, Engr tools and Equip
<i>Ord Tn</i>	1 Armament Plat (2 mobile repair Trks) 1 Automotive Plat (4 mobile repair Trks and 3 wreckers) 1 Sup Plat (4 parts Sup Trks)	Performs 30% to 60% of the Div 3d Ech inspection, Maint, Sup, and Evac
<i>Unit Tns</i>	Vehicles and personnel of the Serv Co or Btry of the Inf Regt or FA Bn	Performs practically all the Sup and Evac of its unit
<i>Am Sec</i>	Inf Regt: 3 Bn Secs (2 2½-ton Trks each) FA Bn: 3 Btry Secs (3 Trk and Tlr units each)	Draws Am from the ASP and delivers it to the weapon positions
<i>Ki Sec</i>	1 Trk and Tlr unit (3½-ton) for each Co	Draws rations from the Army or Div SP, prepares them and distributes them to the Trs
<i>Maint Sec</i>	1 Wrecker (2½-ton), 1 Parts Sup Trk (2½-ton), and 1 or 2 Maint vehicles (¾-ton)	Reinforces the 2d Ech service of the Co and Inf Bn mechanics
<i>Med Sec</i>	Several ¼-ton Trk and Tlr units	Transports the equipment of the Bn and Regt Aid Stas
<i>Misc Sec</i>	A few Adm and Sup vehicles	Transports organization equipment and Adm Sups
<i>Co and Btry Vehicles</i>	Comd and Rcn vehicles, Prime Movers, Wpn CARRS, Com vehicles, etc.	Primarily tactical. Assists in Sup and Evac by helping carrying parties in forwardmost carry

*Tabulation indicates only those organic vehicles of the Tns which are used in the Sup, Evac, and Maint of the unit. Any vehicles temporarily attached would naturally be included.

FIGURE 1.

trains reinforce them by performing tasks beyond the unit trains' capabilities and assisting them in times of stress.

4. All trains are kept under the most centralized control possible, to attain the most efficient operation. This includes unit trains. If trains are "parceled out" to lower units, they will often be standing idle while other units of the division are in dire need of their services.

5. Each train is responsible for its own close-in security. The methods by which this is accomplished will be discussed later.

In accordance with these principles, we note (in Figure 2) that all trains not required for immediate support of the combat troops are grouped together under centralized division control in field train bivouac areas ten to twenty-five miles to the rear, being released to go forward only when and where required. The combat trains which are required for immediate support are grouped together in the combat train bivouacs under unit control four to six miles in rear of the line of contact.

To illustrate how these principles operate, let us consider the supply of rations. Higher headquarters (usually army) places the rations within reach of the division in the Class I supply point (see Class I Supply Point No. 3 at extreme right of Figure 2). The unit, using a portion of its kitchen trucks, transports the rations from the supply point to the field train bivouac under the control of the division. The ration is distributed to the company kitchens and the meals are usually prepared in the field train bivouacs. (At times it may be necessary to prepare the meals in forward battalion kitchen train bivouacs.) Normally, at darkness the kitchens are released to unit control and carry the prepared rations forward to the combat troops. The kitchens normally would revert to division control in the field train bivouac just prior to daylight, after having issued a hot breakfast and cold lunch to the combat troops. Until such time as it was necessary to draw rations, these kitchen trucks would be available for any service the division re-

quired. The supply and evacuation of other classes of supplies is generally the same, and the details will not be included here as they may be found in the appropriate field manuals.

The normal supply, evacuation, and maintenance of the division, described in previous paragraphs, would operate automatically in accordance with the Standing Operating Procedure published, and no action by the division commander or his staff would be required. However, in combat numerous occasions will arise when the standard practices will not suffice. This may be caused by the fact that army is unable to place their supply points within normal reach of the division, or the expenditure rates of various classes of supply have become unusually high, or any number of other reasons. It is then necessary for the division commander and his staff to take action with his own organic means or any that he may secure.

In the case of a critical transportation situation, how may he assist? He could use his pooled supporting means to place supplies closer to his subordinate units by establishing division supply points, thus relieving the strain on the unit trains by decreasing the length of their haul. This is not the best method as it introduces another unloading and loading operation. A better plan is for the division commander to assist his overburdened trains by the attachment of additional transport to the unit trains from his pooled reserves. This not only eliminates the extra handling but also once again places the means of supply in the hands of the interested individuals. Remembering that the division commander retains a maximum number of the vehicles under his control at all times, he would assist an overtaxed subordinate unit by first releasing more of the unit's vehicles to its control, and then if still more assistance was required, by passing (attaching) additional vehicles to its control. In each case he would issue mission type instructions to all concerned, which would state:

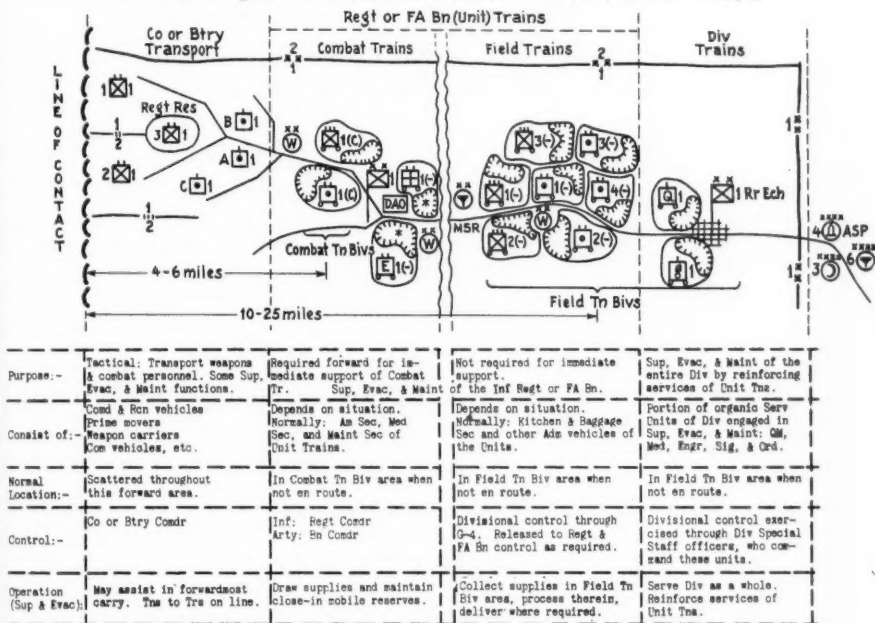
1. The number of vehicles attached.
2. The purpose of the attachment.

3. The time and place of attachment.
4. The time and place at which the attachments were to revert to division control.

Mention must be made of methods employed in the security of this vital element of the division. To operate efficiently it must be protected at all times. On the other hand, care

by locating the bivouacs so that they are as far to the rear as the proper support of their unit will permit; also by grouping the train bivouacs so that they offer each other mutual security and take advantage of the protection afforded by the terrain and any combat troops which may be in the area. It is im-

INFANTRY DIVISION TRANSPORT
Schematic Diagram to Illustrate the Use of Division Trains for Supply.



* Normally termed Div Trn.

NOTE:- The practical application of the basic principles illustrated above may present a different picture due to the modifications required by the specific situation.

LEGEND:



- Portion of allotted area actually occupied.

(1062)

FIGURE 2.

must be taken that the primary mission of trains is not jeopardized by our efforts to secure them. Protection of the trains is assured by making each train commander responsible for his own close-in security, and by having all the service personnel trained in combat duties as soldiers.

When in bivouac, security may be afforded

portant to note that a definite area should be designated for each train bivouac rather than one big goose egg for all trains, as the latter will result in confusion. Maximum use is made of concealment and dispersion. Arrangements are made for timely warning by posting lookouts and tying in to all warning nets. Definite defense plans are formulated

and drills executed to insure their proficient operation. Higher echelons of command are constantly informed of the train situation so that help may be sent if necessary.

During movements, trains are provided security by moving rapidly from cover to cover over carefully selected covered and defiladed routes. Dispersion is practiced by assuring proper road distances. Warning is provided by the observation of all occupants of the vehicles, who are also charged with the resolute manning of all weapons whenever definitely attacked. Additional security means are requested at critical points along the route (assembly positions, closing areas, defiles, etc.); and if the situation is particularly grave, armored escort may be requested.

Though the necessities of combat may cause many wide departures from the foregoing, all concerned should operate in as close

accord with these principles as the situation permits. It is not intended that the illustration shown in Figure 2 be considered as an actual map layout. It was designed primarily to illustrate graphically the organization and normal operation of the trains of a division.

In conclusion, the following points should be stressed:

1. All trains should be so located and controlled that they can support the division wherever and whenever required.
2. Every effort should be made to secure the maximum use of vehicles by pooling all service vehicles under the most centralized control possible.
3. Trains must be protected at all times, but not at the expense of decreasing the effectiveness of their support of the troops.
4. If need be, the trains will have to fight to fulfil their mission.

Cooperation of AAF and RAF in France

From a British source.

THE U. S. Eighth and Ninth Air Forces join with RAF Bomber Command and the Second Tactical Air Force to work against the Germans. For the purposes of air support there has been no point of demarcation between the British and American sectors of the Normandy front.

Although administrative and supply considerations have caused American and British air units to be allotted air bases in sectors held by their respective armies, and calls for immediate air support have therefore generally been best answered by air units in the vicinity, rocket-firing RAF Typhoons have destroyed scores of tanks opposed to Americans. Likewise, American P-47 Thunderbolts have done some excellent dive-bombing on parts of the British front.

This joint endeavor has been shown to best advantage in big attacks. For example, British heavy and American medium bombers worked together over an area south of Caumont into which the British were about to

thrust. In this operation, not only did the Allies cooperate in a joint effort, but also in an exchange of ideas. On this day there were low clouds, making visible bombing dangerous. Therefore the Ninth Air Force's B-26 Marauders used the RAF's Pathfinder method of putting down marker flares on the targets and bombing from the cover of cloud on the markers' glare. Bomber Command's Lancasters and Halifaxes, on the other hand, resorted to the visual method more often employed by the Americans, coming down below the cloud base at 2,000 feet to do their bombing.

Two coordinating instruments shape Allied bombing policy. One is a committee composed of equal numbers of American and British Air Force officers who allocate the bigger bombing targets between the two air forces. The other is the frequent meetings of the commanding generals of the American Air Forces with the commanders in chief of the RAF Commands, to discuss concerted action in support of the Allied Expeditionary Force.

MILITARY NOTES

AROUND THE WORLD

GREAT BRITAIN

A New Spitfire:

The latest Spitfire, Mark XI, is completely unarmed and relies on its great speed to escape combat while carrying out long-range photographic reconnaissance missions. Instead of guns it carries long-range petrol tanks in the leading edge of its wing. It has a 1,650-horsepower Rolls-Royce Merlin engine and a four-bladed propeller.

The Spitfire in all its forms is the direct descendent of the Schneider Trophy racing seaplanes which won the trophy for Britain in 1931. The first Spitfire made its debut five years later in June 1936, eight years ago. Just before the war this great fighting plane had a maximum speed of 367 miles per hour; today it is nearly one hundred miles an hour faster.

(From a British source)

The Typhoon:

The Typhoon is the latest of a long line of famous aircraft built by the Hawker Aircraft Company, whose famous Hurricane played so important a part in shooting down 2,375 German aircraft in the eight weeks of the Battle of Britain. The Typhoon is designed for day and night operations at medium and low levels and is particularly suitable for ground attacks. Its power is provided by a 2,200-horsepower Napier Sabre engine of the type known as the "rolled-over-H," which drives a three-bladed propeller of fourteen feet diameter. An unusual feature of the Typhoon is the combined cooling and air intake system slung under the "chin" of the aircraft. Apart

from the rudder, which is fabric-covered, the Typhoon is an all-metal aircraft.

The Sabre engine has twenty-four cylinders arranged in four banks of six, horizontally



MARK 1B TYPHOON, SHOWING TWO OF THE 20-MM CANNON.

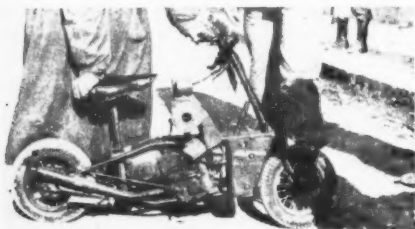
opposed, driving twin crankshafts set one above the other, both crankshafts being geared to the airscrew shaft. It will thus be seen that, viewed from the front, the engine's contour is that of a "rolled-over-H" or, in other words, an H lying on its side.

Armament has been varied in different Marks of the Typhoon. Mark 1A carried twelve machine guns of .303 bore, six mounted in each wing firing outside the propeller arc. Mark 1B carries four 20-mm Hispano Mark II cannons, two in each wing (see photo). This Mark also carries a 250-pound or 500-pound bomb under each wing.

(British Information Services)

British Midget Motorcycles:

British midget motorcycles are light and portable and can be easily transported in large numbers by air. They have no starter or gears and are merely shoved forward for



starting. Their speed is about forty kilometers an hour in direct drive. These motorcycles were dropped in France from British troop-carrying transports and were later used by couriers between the partisans and the British forces.

(*Berliner Illustrierte Zeitung*,
Berlin, Germany)

Golden Arrow:

The Golden Arrow is the name of the line of gray-green vehicles carrying the British Army's biggest mobile radio stations which are designed to provide communication between the armies in France and Anglo-American GHQ's in Britain and elsewhere. They can also handle newspaper correspondents' dispatches.

Golden Arrow radio stations, manned by men of the Royal Signals Corps, are entirely mobile and self-supporting. They even include their own cook. On the road "the train" consists of five vehicles—a seven-ton receiving vehicle, a four-ton transmitting vehicle, two three-ton trucks containing the men's equipment, stores, etc., and towing two generators (one a spare) mounted on trailers. The procession is headed by the officer's utility car.

The station can be erected in less than four hours, providing the equivalent of a small fixed commercial high-power radio station which normally would take many months to put up. It is capable of transmitting and re-

ceiving 30,000 words a day over considerable distances.

The crew consists of one officer and twenty-two operators of the Royal Signals Corps. The men undergo a short course in which they learn to do each other's jobs—receiving, transmitting, typing, and clerking—and to drive the vehicles and defend the station if necessary.

When they reach the site, they must erect five forty-foot masts. Owing to its bulk and complexity the station can only be used for main arteries of communication, as for instance between army HQ and GHQ, or between mobile GHQ overseas and a fixed station in Britain.

(From a British source)

U. S. S. R.*Geologists Help Red Army:*

Over 300 Soviet geologists and hydrogeologists organized in special detachments are accompanying the Red Army's advance. Mapping groups supply the Command with maps showing localities convenient for passage of tanks. Field reconnaissance groups arrange for water supply for the troops, and prospect for local building and camouflage materials. The field geological detachments are trained at a special center, the staff of which includes such prominent scientists as Professor Shchegolev, Altovsky, and Semikhatov.

(*Information Bulletin*,
Washington Embassy of USSR)

Work of Soviet Naval Forces:

According to the Soviet Information Bureau, the Soviet naval forces during thirty-seven months of this war [to 22 July 1944] have sent to the bottom one auxiliary cruiser, thirty-seven destroyers, fifty submarines, two coast defense battleships, 850 transports, 392 self-propelled barges, and 1,505 other auxiliary vessels—altogether, 2,837 enemy ships sunk.

In addition to this, naval and coast artillery guns and naval aircraft have destroyed 6,829 enemy aircraft.

(*Pravda*, Moscow)

JAPAN

New Jap Guns:

The principal Jap aerial weapons at the beginning of the war were the 7.7-mm, the low-velocity 20-mm, and a few 12.7-mm guns. Now they are substituting the 20-mm and the 12.7 for the 7.7 and developing more powerful 20-mm guns.

The higher velocity 20-mm antitank gun, which has been generally abandoned for antitank use, has appeared as a free mount in bombers, despite its comparatively slow rate of fire. In order to meet the demand for guns of larger caliber, single-shot 37-mm tank guns have been mounted in Jap fighter planes. There have been reports also of 13-mm and 25-mm guns being mounted in some aircraft.

(*Air Force*)

Self-Sealing Gasoline Tank:

The Japanese have finally developed a workable self-sealing gasoline tank for their aircraft. The sealing cover consists of several layers of rubber with a total thickness of 1½ inches, and tests of AAF engineers on tanks found in captured planes show the tank will fully reseal after being punctured by one-inch wide holes.

(*Marine Corps Gazette*)

GERMANY

Miniature Two-Man Tank:

This miniature two-man tank, of French manufacture, was captured from the Ger-

mans in Italy. The tank appears to have folding armored hoods for its occupants.

(*The Illustrated London News*)

Ju-87 with 37-mm Antitank Guns:

The Ju-87 is armed with two 37-mm antitank guns, one under each wing. The gun mounts are bomb-shaped. The guns are com-



pletely automatic and are actuated from the pilot's cabin. The ammunition is brought in on a loading belt.

(*Der Adler, Germany*)

New Antiaircraft Weapon:

A new antiaircraft weapon used by the Germans consists of a box-like missile thrown into the air by guns or rockets. When it reaches the desired height the box releases metal ribbons which are presumably designed to wrap around the propellers of the attacking planes.

(*The Aeroplane, Great Britain*)

A Giant German Gun:



Members of the Soviet Supreme Command are here seen in Moscow studying the huge outlines of a heavy siege mortar captured from the retreating Germans. The gun is believed to be either a 240 or 305-mm piece.

(*The Sphere*, Great Britain)

CZECHOSLOVAKIA

Czechoslovak Army:

Shortly after the collapse of France an independent Czechoslovak military unit was formed in the Middle East from refugees arriving from the USSR and others who came from Czechoslovakia via the Balkans. This unit took part in the fighting in the Western Desert, in Syria, and in Tobruk.

After the German attack of 1941, an independent Czech unit was formed in the USSR, from those internees who had found their way into Russia after the collapse of Poland.

Czech units under the British High Command are trained in accordance with British methods. A number of units, amounting to thirty-five percent of the total strength, have been trained as commandos or paratroops.

Three Officer Cadet Training Units have been set up within the framework of the Czech forces. There is also a course for General Staff Officers.

(*Aim*, army magazine of the British Middle East Command)

BRAZIL

Brazilian Troops Overseas:

A new chapter in Latin American history was written at Naples, Italy, on 16 July 1944, when what the press described as a "strong contingent" of Brazilian troops landed there to join in the Allied offensive. Never before had a Brazilian or any other Latin American force entered an overseas combat zone.

For nearly two years—since 22 August 1942 when Brazil declared war on the Axis because of continued sinkings of Brazilian shipping—the nation had been awaiting the time when its soldiers would take an active part in Allied overseas operations. In the meantime, Brazil's peacetime army had been transformed through intensive training into a strong modernized fighting force. Its development was speeded by Brazilian-United States military cooperation, modern lend-lease weapons and equipment having been made available in sufficient quantity to give the Brazilian troops thorough practice in present-day warfare.

Brazil's largest training center is Vila Militar, some fifteen miles from Rio de Janeiro, where recruits and young officers are instructed in the infantry, artillery, signal corps, and motor mechanization schools. The latter, the newest field of training, boasts a wide assortment of tanks, scout cars, jeeps, and other up-to-the-minute United States-made war machines.

(*Bulletin of the Pan American Union*)

INDIA

Indian Officers:

When the last war ended there were only twelve commissioned Indian officers in the Indian Army. The process of Indianization had progressed so rapidly in the years before the war, that when it broke out the number had grown to 307.

The Indian Army itself has grown enormously from some 200,000 in 1938 to the present strength of 2,250,000 Indians, of which over 10,000 are Indian officers—that is, thirty-five percent of the officers in the Indian Army. The policy is to increase the percentage as rapidly as is practical until it reaches one hundred percent Indian.

Indian divisions are formed of Indian Army and British Army units brigaded together. Originally the Indian Army followed a policy of placing Indian officers in command only of Indian troops. This policy has now been abandoned and Indian and British officers may both have European and Indian troops under their command.

(From a British source)

UNITED NATIONS

Notes on the Invasion of France:

Although the Germans launched a series of secret weapons, including human torpedoes and explosive motor boats, against Allied cross-Channel shipping, more than a million men were landed in the first twenty-eight days of the invasion of northern France. Up to D + 28, 183,500 vehicles and 650,000 tons of supplies also were deposited on French shores.

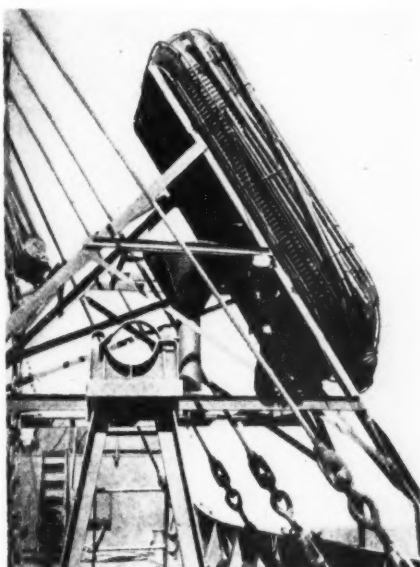
During this time the enemy used hundreds of U-boats, aircraft, human torpedoes, and explosive motor boats against the Allied craft. Attacks by torpedoes and motor boats reached a peak during the first week of August and they took a fair toll of Allied shipping—but their own losses were so large that the raids were abandoned.

(From news reports)

UNITED STATES

Unsinkable Steel Life-Raft:

This life-raft, now being made in California, is constructed of 16-gauge cold rolled



steel. It is sixteen feet two inches long with an eight-foot beam. In the outer shell there are nineteen airtight compartments. The shell is three feet in diameter and has so much buoyancy that the raft sinks only six and a half inches under its maximum load of twenty men. When empty, each raft weighs just over a ton, to which is added more than half a ton of supplies and equipment, ranging from mast, oars, and sails to food, blankets, fishing kit, sea anchor, storm oil, Bible, and playing cards. No matter how the raft hits the water it always floats topside up, for both sides are exactly alike. It is released by a manually operated trigger, and it also has an automatic device, actuated by water pressure, which launches it if the ship goes down. The picture shows how the life-raft is installed on American Victory ships.

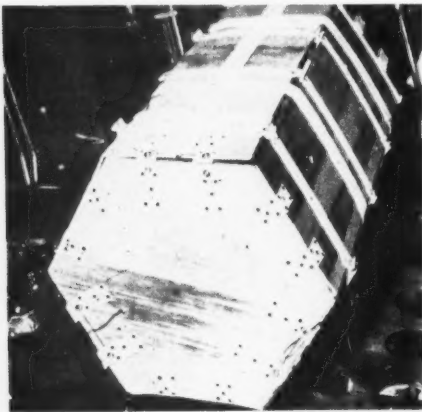
(The Sphere, Great Britain)

Tire Busters:

Steel barbs for puncturing and ripping tires of enemy planes and supply vehicles have been developed by the Matériel Command and approved by the AAF Board. Two



FOUR-INCH, FOUR-PRONGED BARB, DROPPED ON ENEMY AIRFIELDS OR HIGHWAYS, CAUSES TIRES TO BLOW OUT.



COLLAPSIBLE PLYWOOD BOX, CARRIED IN BOMB BAY, SCATTERS TIRE-RIPPING METAL BARBS.

types are packed in containers which are released by bombers at an altitude of 700 feet above airfields and highways. A static line opens the container, spreading the barbs over an area of 200 yards. The "Christmas tree"

type of barb has serrated, hooked projections which rip tires. The tubular type is a four-pronged article. It rests on three of the prongs and the fourth points upward at a 90-degree angle to penetrate "puncture-proof" tubes.

(*Air Force*. Pictures from *Marine Corps Gazette*)

Sherman Tanks with 105-mm Howitzers:

Some of the General Sherman tanks in action in Europe are armed with 105-mm howitzers. The tank is known as the M4, and this is the first time that a field artillery piece of the punching power of a 105-mm howitzer has been successfully installed in a medium tank. This Ordnance Department development also represents the maximum firepower thus far achieved in a fast-moving, highly maneuverable medium tank.

Today's tank howitzer is mounted in a combination gun mount with a .30 caliber machine gun and has a 360-degree traverse. Additional armament includes another .30-caliber machine gun, a .50-caliber machine gun, a mortar, a .45-caliber submachine gun, hand grenades, and smoke bombs. A commander's vision cupola is equipped with six prismatic vision blocks of three-inch laminated bullet-resisting glass and affords a wide field of view.

The tank weighs approximately thirty-three tons, has a speed of twenty-four miles an hour, and carries a crew of five.

(*Army and Navy Register*)

Split-Second Bomb:

A new bomb which explodes nine ten-thousandths of a second after impact is being used by American airmen, and the ordnance section, Air Service Command, states that fliers can control the explosion down to one ten-thousandth part of a second. The bomb is designed for factory machinery destruction and can be timed to explode in the center of a plant. A mistake of one ten-thousandth of a second in fuze setting could make the difference between successful demolition and merely blowing the roof off an enemy factory.

(*Marine Corps Gazette*)

FOREIGN MILITARY DIGESTS

Employment of Operational Reserves in the German Army

Translated at the Command and General Staff School from a Russian article by
Colonel N. Loschagin and Colonel A. Melnichuk in *Krasnaya
Zvezda* (Red Star) 17 June 1944.

OPERATIONAL reserves, according to the German doctrine, serve as the main shock force in defense and are the decisive factor in the exploitation of success. On the Soviet-German front, operational reserves are formed from divisions and other units at the disposal of the commander of an army or of an army group, or they may consist of newly formed units or units brought up from the deep rear. As a rule, operational reserves are composed of mobile troops possessing great shock power, such as tank divisions, motorized divisions, and the best-equipped infantry divisions. The main task of the infantry divisions is to consolidate the attained success.

The number of units forming operational reserves in armies or army groups depends on the situation on the front and on the available forces. The German command has a tendency to have strong reserves, even at the cost of weakening the troops on the front. On the Soviet-German front the operational reserves average from one to three divisions in armies, and from two to five divisions in army groups. They are employed in a strictly centralized manner.

Depending on the situation and on the nature of projected operations, either the command of the army group or the supreme command assumes the control of the operational reserves and concentrates them in one decisive direction, creating a powerful shock force. Thus, in preparing the summer of-

fensive in 1943 in the Kursk sector, the German command formed the reserve from a great number of units obtained as a result of the reorganization of the central army group and brought into the Kursk sector operational reserves from other fronts. This enabled the Germans to concentrate in the Orel-Belgorod sector seventeen tank divisions, three motorized divisions, and eighteen infantry divisions.

In defensive operations, German operational reserves are composed, for the most part, of tank and motorized divisions. Their mission is to liquidate breakthroughs and to restore the situation. Under favorable conditions, the Germans use their operational reserves for counterattacks with limited objectives.

There are special directives in the German army concerning the use of mobile troops in counteroffensives. These directives are based on the experience of the recent battles on the Soviet-German front. The directives are incorporated in the "Memorandum Concerning the Use of Tank Units," approved by the German High Command. This memorandum categorically requires that the operational reserves are not to be split up but are to be used en masse in the main direction.

"If an army," quoting from the memorandum, "has in its reserves several tank divisions to be used on a wide front, the command should strive to employ this reserve without splitting it. In the event the enemy breaches our defense in several places, all

available tank units of the operational reserve should be used, first, for the liquidation of the breakthrough in one sector, and then for a similar action in other sectors."

The same document states that "piecemeal employment of tank divisions in battle leads in most cases to the suspension of their operations in view of the danger developing on the flanks."

It should be noted, however, that in spite of these directives the Germans were forced in the past offensive campaigns of the Red Army to split their operational reserves and use them prematurely. Our troops, extensively using the tactics of maneuvering, did not let the Germans consolidate on defensive lines but breached them in many places simultaneously. In order to fill in the gaps, the German command used not only all the tactical reserves but also the operational reserves. This was done despite the fact that the latter were supposed to be used only for massed action against our troops engaged in breakthrough operations and for shifting to counteroffensive.

In the defensive battles waged by the German 6th Army in the Nikopol sector early in February 1944, the command of the army had operational reserves composed of the 9th and 24th Panzer Divisions concentrated in the expected direction of the main effort of our attacking troops. Because of the difficult situation, however, the Germans were compelled at the beginning of January to transfer the 24th Panzer Division to the Kirovograd sector and the 9th Panzer Division to Krivoy Rog. Thus, when the Red Army launched a decisive attack northwest of Nikopol, the command of the 6th Army had no operational reserves at all. The Germans attempted to bring back in a hurry the 9th Panzer Division, but it arrived at the battle zone much too late, was committed in battle right from its march formation, and was quickly defeated by the Red Army units which had broken through the German defenses.

Furthermore, many times, as a result of the difficult situation on the front, tank and motorized divisions forming the operational

reserves relieved the weakened or defeated divisions, occupied their defensive zones, or covered their withdrawal. The infantry divisions of the German 11th Army Corps, retreating in the direction of Kremenchug in September 1943, had been so depleted that they were unable to offer any organized resistance. The commander of the corps was compelled to use for defense on successive positions the SS Panzer Divisions "Reich," "Totenkopf," and "Great Germany," taken from the reserve. Under their cover were retiring the remnants of the routed infantry divisions.

In the fall of 1943, when the Germans attempted to halt on the western bank of the Dnieper, the commander of the southern army group, Field Marshal Mannstein, issued a directive. In addition to the reinforcement of the first-line infantry divisions, he ordered the formation of operational reserves composed of tank and motorized units. In his directive the Field Marshal pointed out, by the way, that with the arrival of the season of bad roads the Red Army would be unable to undertake large-scale offensive operations. The operational reserves, therefore, were given various unimportant missions such as the reinforcement of threatened sectors and even the relief of first-line units.

This is what Mannstein wrote in his directive: "Since the enemy during the season of bad roads will be unable to undertake large-scale operations and will limit himself to forcing the river in order to establish himself on the western bank, it will be necessary to use Panzer and motorized units for the reinforcement of the threatened sectors and for supporting and, in exceptional cases, for relieving the grenadier regiments. . . ."

"During this season, the reserves, depending on the situation, should be located closer to the front line and to the points to be used by the enemy for the forcing of the river than during dry weather and first fall frosts."

The Red Army, as is well known, disrupted once more the plans of the German command by inflicting a decisive blow precisely at the season of the year when the enemy did not expect it at all.

Not without interest is the opinion of the German command concerning the element of surprise in shifting from defense to offense. Inasmuch as this requires the concentration of considerable forces brought up from the deep rear, the German command believes that in the commitment of tank and mechanized resources, operational surprise cannot be easily attained. This contention is confirmed by the following directive of the German High Command:

"The approach of tank divisions from the rear, as a rule, cannot be concealed from enemy reconnaissance. Operational surprise, if such is possible at all, may be attained only when considerable forces are available. It is, therefore, the task of the high command to create the prerequisites for securing tactical surprise."

The following are considered by the Germans as prerequisites for tactical surprise: the retention at any cost of an area having a tactical importance for the planned counteroffensive, in spite of the danger of a breakthrough; planned withdrawal to a favorable terrain feature necessary for the organization of the counteroffensive. In the course of counteroffensive the Germans use their tank divisions not for frontal but for flank blows.

When our offensive is carried out with superior forces, the Germans discontinue their counteroffensive and shift to defense. The German High Command continues a counteroffensive only when the attack of our troops is disrupted and the Germans attain considerable superiority in forces. The commitment of operational reserves in counterattacks (particularly tank divisions) from the march without preliminary and thorough preparations is forbidden.

Tank units of German operational reserve were used en masse in the counteroffensive in the Zhitomir sector in November 1943, and this year in the Korsun-Shevchenko sector where the enemy tried to rescue his encircled group southeast of Stanislav. They were also frequently used in the sector north and west

of Jassy. In each of the mentioned German operations, usually from three to six tank divisions and up to seven infantry divisions participated. Their operations were supported by aircraft flying up to 1,500 sorties a day. In addition, the enemy used a great number of artillery and mortar units of the GHQ reserve. In the Stanislav sector the operations of the enemy shock group were supported by an artillery division. As is well known, all these counteroffensives failed. Having encountered stubborn resistance on the part of our troops and having suffered tremendous losses in manpower and matériel, the enemy was compelled to discontinue the operations.

Certain characteristic features of the German tactics when their counterthrusts have only limited objectives should be noted. First of all, before the beginning of active operations, the enemy conducts reconnaissance-in-force all along the front of the proposed breakthrough simultaneously. The ground forces are supported by aircraft operating in groups of up to 120 planes each, which methodically attack the battle formations of the defenders, especially their artillery firing positions. Artillery and six-barreled mortars are used en masse. The infantry acts cautiously and only after a strong aerial and artillery preparation. It is directly supported by a great number of tanks. Also noteworthy is the rapidity of German regroupments organized to divert our forces from the direction of the main effort. An increased German activity at night is also observed.

Having suffered tremendous losses from the shattering blows inflicted by our troops, the Germans are now confronted with the problem of reinforcing their tactical reserves in the first-line divisions and creating operational reserves. The German command is trying to solve this problem, but the shortage in manpower and armament, as well as the situation created now on the Soviet-German front and in the west, makes its solution difficult.

Report on the Flying Bomb

Digested at the Command and General Staff School from a pamphlet published by British Information Services, September 1944.

On the night of 12-13 June 1944, the first flying bomb fell on southern England. During the weeks that followed, more than 21,000 people were killed or injured, and more than 1,104,000 houses destroyed or damaged. The damage would have been far greater but for the preparations and steps taken to counter the attack; and it would have been multiplied still further but for the measures taken, even before the bombing began, against the factories and launching sites in Germany and France.

These preparations and measures are described in this paper by Mr. Duncan Sandys, MP, Chairman of the Committee on Operational Measures against the Flying Bombs, set up by the British War Cabinet.

EXCEPT possibly for a few last shots, the Battle of London is over. This battle against the flying bomb has been going on now for eighteen months.

The first six months were a period of inquiry and enthralling speculation. It was in

April 1943 that the Chiefs of Staff sent me four rather vague reports from secret agents which suggested that the Germans were developing a long-range bombardment weapon of some novel type. I was asked to investigate and recommend action.

Throughout this investigation, I had the assistance of the intelligence machines of all three Services and the advice of many leading scientists and engineers.

These four reports led us to suspect that the new weapon was being developed on the Baltic coast. Accordingly, reconnaissance aircraft were sent to photograph the likeliest areas in that region.

Photographs obtained early in May showed that, at Peenemunde, on an island in the Baltic, there was what appeared to be a very large experimental station [see Figure 1]. We were much puzzled by the lay-out of the establishment which possessed many peculiar features that we were unable to explain.

We photographed Peenemunde again and again, as often as the weather allowed. On later photographs, expert interpreters of the

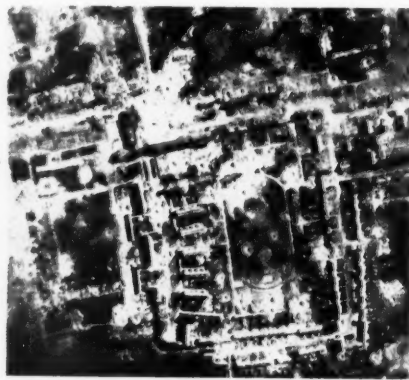
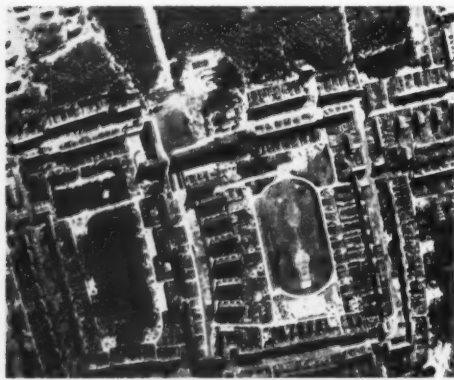


FIGURE 1.

WHERE THE FLYING BOMB WAS BORN. PEENEMUNDE AIRCRAFT RESEARCH ESTABLISHMENT ON THE BALTIC BEFORE AND AFTER BOMBING BY THE RAF. (FROM "THE ILLUSTRATED LONDON NEWS.")

Air Ministry drew our attention to a tiny blurred speck. On close examination, it could be seen that the object was the shape of a miniature airplane sitting on what appeared to be an inclined ramp fitted with rails. Still later, a photograph showed that near the ramp the ground was blackened with dark streaks such as might have been caused by a hot blast.

Having regard to this and other information, it was deduced that the object seen must have been a pilotless, jet-propelled aircraft. We did not, of course, at that time, know for certain whether this was an offensive weapon or merely a target plane of the Queen Bee type.

Our doubts were removed when we discovered last November that the Germans were building all along the French coast, from Calais to Cherbourg, a whole series of concrete structures which had certain unmistakable features in common with those seen at Peenemunde and elsewhere on the Baltic.

Furthermore those who examined the photographs drew our attention to the sinister fact that almost all the French coastal constructions appeared to be oriented towards London.

As a result of extensive air reconnaissance throughout the difficult winter months, we eventually discovered over 100 of these concrete constructions. The British and American Air Forces started attacking these flying-bomb sites last December and continued incessantly through the winter and spring until every one was destroyed. The enemy tried to repair them. As they were repaired they were re-bombed.

In the end, the Germans abandoned these launching sites altogether and started, about last March, constructing an entirely new series of firing points of enormously simplified

design [see Figure 2]. Most of the buildings, including conspicuous storage accommodation for bombs and fuel, were entirely eliminated.

After the destruction of the first series of sites, the Germans had to start again from scratch and it was therefore well into sum-

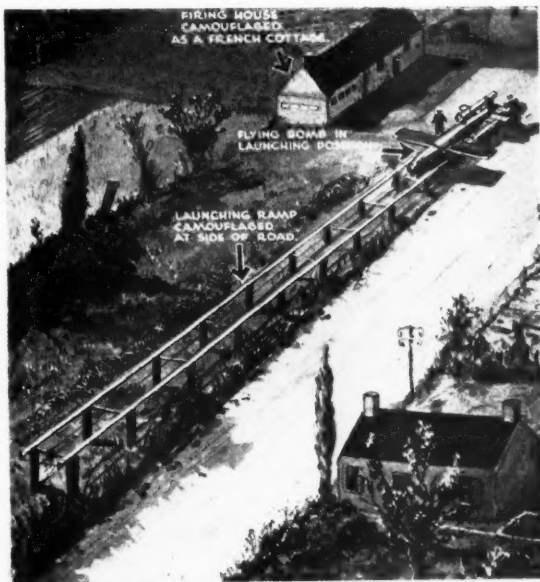


FIGURE 2

DRAWING OF LATER TYPE OF SIMPLIFIED RAMP USED IN LAUNCHING FLYING BOMBS AFTER RAF DESTRUCTION OF THE MORE ELABORATE INSTALLATIONS. THE RAMP IS ABOUT 200 FEET LONG AND RISES AT AN ANGLE OF APPROXIMATELY SEVEN DEGREES. IT IS EASILY CAMOUFLAGED AND THE BUILDINGS USED IN CONNECTION WITH THE LAUNCHINGS GIVE THE APPEARANCE OF AN ORDINARY FRENCH VILLAGE. (FROM "THE ILLUSTRATED LONDON NEWS.")

mer before the second series was completed.

By this time, our Intelligence Services had pieced together sufficient information about Hitler's secret V-1 to enable us to go ahead with detailed arrangements for the defense of London. The plan for the deployment of our defenses was drawn up in January and extensive administrative preparations were put in hand forthwith. The plan provided for three defense belts—a balloon barrage just outside London, a gun belt just beyond that, and, beyond that again, a fighter zone.

However, there was at the same time a competing operational claim for available

guns and balloons. Preparations for the invasion of France were going on and anti-aircraft protection was needed for embarkation ports and assembly areas.

We did not, of course, know whether the flying-bomb attack would start before, after, or during the invasion operations. Consequently, our deployment plans had to be very flexible. In point of fact, the attack started a few days after the landing in France.

During the first month, fighters, guns, and balloons together brought down some forty percent of bombs launched. From the point of view of the defenses, there were several awkward features about the flying-bomb attack. The bomb flew at a very high speed—between 350 and 400 miles per hour. In an attempt to saturate our defenses, the enemy, to an increasing extent, launched the bombs in salvos and also concentrated, as far as possible, the weight of the attack in periods of cloudy weather which restricted the operation of our fighters. On certain dull days, 200 flying bombs were launched within twenty-four hours.

The height at which the bombs flew also presented our guns with a difficulty. The bombs came in at an average of 2,300 feet. Some came in a great deal lower—rather too low to get the best results from our heavy guns and rather on the high side for our 40-mm and 20-mm light guns.

Originally, we had deployed some 500 balloons. However, when it was seen that the bombs were consistently flying low, it was realized that the balloons might play a very appreciable part; consequently, the barrage was rapidly thickened up to nearly 2,000.

The balloons were, of course, the last line of defense. Nevertheless, the balloons made a substantial contribution to the defense of London. Of the bombs entering the barrage area, nearly fifteen percent were brought down.

The gun belt, which stretched roughly from Maidstone to East Grinstead, had been sited as far inland as possible so as to reduce to a minimum the length of the front needed to screen London.

In order to insure the quickest possible de-

ployment, the defense plan had provided largely for the use of mobile 3.7-inch guns. However, experience showed that the low altitude of the bomb, combined with its high speed, was too much for these manually operated guns.

About the middle of July, it was decided to move the entire anti-aircraft belt down to the coast so that the guns should get an uninterrupted field of view. This move entailed a lengthening of the front and, in consequence, necessitated the deployment of many additional guns. This re-deployment was a vast undertaking. In all, some 600 heavy and 500 Bofors guns had to be moved and re-sited. Yet the guns were out of action only two days.

At the same time, arrangements were made to replace all heavy mobile 3.7's by static guns.

Since the guns were sited on the coast, a high proportion of the bombs destroyed were brought down harmlessly into the sea. In fact, during the last fortnight, only forty-five percent of the bombs launched got across the English coast, as against seventy-five percent in June.

During the first few weeks of the flying-bomb attacks, fighters operated in a single zone stretching over sea and land from off the French coast right up to the gun belt. During this period fighters shot down over 1,000 flying bombs. This represents nearly thirty percent of the number launched.

When the guns were re-deployed along the coast, the fighter zone was divided into two parts. The first was from the boundary of the gun belt to about seven miles out from the English coast. Behind the gun belt, there was a second fighter zone stretching up as far as the balloon barrage. The most propitious place for fighters is over land, not over sea. It is difficult to see these bombs at all because they are such small objects and they move so fast. Over land there are certain aids. For example, the running commentary over the radio telephone might tell the pilot where the bomb was in relation to various landmarks, whereas over water one bit of sea looks much like another.

So far as fighters over land were concerned, any remaining difficulties of this kind disap-

peared when the guns were re-deployed along the coast. Bursts of antiaircraft fire over the gun belt showed pilots clearly where the bombs were and enabled them to dive on to those which had not been shot down.

Over the sea, the difficulties remained. There were no landmarks and no gun belt. In an attempt to direct the pilots, a flotilla of motor launches was stationed out in the Channel. These ships were capable of firing maroons and talking to fighter pilots by radio telephone. However, the scheme was not long enough in operation for us to be able to measure the effectiveness of these new methods.

In the battle against the flying bomb, our fighters were faced with a number of difficulties. The first was the speed of the bombs. Only our fastest fighters possess the high speed needed to overtake the bomb in level flight. Other types had to position themselves two to three hundred feet above and then dive down upon it to get the additional speed to overcome it. The problem of exactly hitting off the correct angle of the dive was a very difficult one and could only be mastered with experience.

I myself went up on night patrol in Mosquitoes once or twice and have seen how difficult it is. You see the bomb miles away coming in over the sea and get into the right position to dive on to it. It looks like money for jam, but when it comes to the point even the most experienced pilot can misjudge the speed or course of the bomb, or the speed of his own dive, so that you find you have flattened out in the wrong place and the bomb just streaks away from you. Some pilots have shot down over fifty bombs alone—a performance of great personal skill.

In times of intense activity, between thirty and forty aircraft had to be continuously on patrol in the air.

In the hours of darkness it was, of course, easy enough to spot the flaming tail of a flying bomb many miles away. On the other hand, night presented its own peculiar difficulties. In order to bring down the bomb, the pilot must fire his guns at a range of about 300 yards. If he fires when he is too far away,

he probably won't destroy the bomb. If he fires when too near, the bomb may blow up and destroy him.

However, by night it is very difficult indeed for the pilot to estimate how far away he is from the bright light of the jet. Professor Sir Thomas Merton produced a simple, ingenious range-finder which proved to be the complete answer. It was so simple that the whole device cost little more than one shilling [twenty cents].

I have spoken about our defense measures against flying bombs launched from sites in the Calais and Dieppe areas—that is to say, from the south and southeast. However, as was noticed by many people, a small proportion of the bombs came in from a due easterly direction.

This puzzled us a little at first; because, as far as we knew, there were no firing sites in either Belgium or Holland. However, we very soon obtained information that these flying bombs were being launched not from the ground, but from aircraft. Specially adapted Heinkel bombers were carrying bombs pick-a-back and launching them from the air over the North Sea. These bombs proved less accurate than those fired from the land.

To meet this new form of attack, additional guns were rapidly deployed in the Thames Estuary, and Intruder squadrons were sent out each night to patrol over the Dutch and Belgian coasts. At the same time, attacks were made upon the airdromes from which the launching planes were operating.

These countermeasures reduced the scale of the airborne launchings to very small proportions. This form of attack can, of course, be carried on from bases in the heart of Germany.

During the eighty days' bombardment, the enemy launched over 8,000 bombs, that is to say, about 100 a day. Of these, some 2,300 (twenty-nine percent) got through into the London region. These figures do not include many bombs which came to grief in France. Even of the bombs successfully launched, some twenty-five percent were inaccurate or erratic. Many dived into the sea of their own accord.

Others strayed as far as Norfolk and Northampton. The remaining forty-six percent were brought down by combined efforts of guns, fighters, and balloons. This is the average over the whole period. Since the start there has been a steady increase in the toll taken by the defenses and a corresponding diminution in the number of bombs reaching London.

Our defense plans were designed to insure that, insofar as possible, bombs should be brought down in the sea or in open fields. This aim was very largely achieved.

American batteries provided about one-eighth of the total number of heavy anti-aircraft guns along the south coast and have contributed their full share to the joint bag.

Ever since the Bomber Command made its great raid on Peenemunde in August of last year, the British and American Air Forces have been conducting a continuous battle against Hitler's secret weapons. The targets attacked included launching sites, storage depots, and communications in France, as well as factories, special fuel plants, and experimental stations in Germany. Altogether, they dropped on these targets over 100,000 tons of bombs.

All this has not been done without loss. On these operations the British and American Air Forces together have lost nearly 450 aircraft, including many heavy and medium bombers, involving the loss of approximately 2,900 pilots and air crews.

Bombing cannot be separated from Intelligence. In the battle against the flying bomb, the Intelligence Services, our agents in enemy territories, air reconnaissance squadrons, and the photographic interpretation units played a vital part. They warned us in the first place of what Hitler was preparing for us, and have since directed the bomber forces with remarkable precision onto the weak links and bottlenecks in the enemy's organization.

For example, in the middle of June, our agents discovered that the famous "people's car" or *Volkswagen* factory near Hanover was, in fact, one of the main assembly plants of the flying bombs. Our bombers were sent out and the factory was totally destroyed. Apart from the numerous attacks against the

launching sites, we, since the start of the bombardment, have concentrated our main effort upon disrupting the enemy's production and supply organization.

Large stocks of flying bombs were stored in tunnels and caves not far from Paris. The existence of these storage depots was reported to us by agents. After confirmation had been obtained by air photographs, bombers went out to destroy them. These attacks were most successful. Many of the tunnel entrances were blocked. In some cases, great 12,000-pounders actually pushed in the roof of the caves, which subsided onto the flying bombs and buried them.

Agents reported that the enemy was moving his stocks to other depots. Many of these in turn were discovered and destroyed.

As a result of these attacks, the enemy's supply arrangements were greatly disorganized. From then onwards he was compelled to feed his firing sites largely by hand-to-mouth methods, bringing the bombs direct from Germany right up into the launching areas.

However, the enemy did not succeed by these means in escaping the attention of the Allied air forces. His lines of communication were continuously watched, and striking forces kept ready to attack the fleeting targets at very short notice. On one occasion a train loaded with some 200 flying bombs stopped at a marshalling yard in north France. The train was detected and the information passed to England in time for our bombers to go out and blow up the train before it moved.

The result of all these reconnaissance and bombing operations was to keep down the enemy's rate of fire over the whole period to an average of 100 bombs a day. From the information in our possession it is clear that this is far less than the rate which he was hoping to achieve.

The destruction of the first 100 launching sites to which I have already referred not only delayed the start of the attack, but also forced the enemy for the sake of concealment to construct his second series on simpler but

less efficient lines. These simplified sites contained no provision for the storage of any appreciable quantity of fuel or bombs. In consequence, their potential rate of fire was greatly reduced and they were much more susceptible to delays or interruptions in the supply line.

The visitation which London has so bravely endured has been painful enough. Had it not been for the vigilance of our Intelligence Services, the unrelenting efforts of the British and American Air Forces, and the effectiveness of the defenses, London's ordeal might well have been many times more severe.

The Power of Infantry Fire

Translated at the Command and General Staff School from a Russian article by Colonel V. Pruntzov in *Krasnaya Zvezda* (Red Star) 11 June 1944.

THANKS to its exceptional power, the fire of modern artillery and of large caliber mortars eclipses, as it were, the infantry fire, and consequently the importance of the latter is underestimated. This underestimation is completely erroneous and leads at times to an insufficient utilization of the fire possibilities of infantry weapons.

The term "infantry fire" embraces all types of weapons of a rifle battalion with the exception of antitank guns. Infantry fire is used during the most decisive moments of battle for repelling enemy attacks and for fighting our way to the enemy when assaulting his positions. In both cases the technical rapidity of fire (rate of fire) of the weapons is used to its full extent. The effectiveness of infantry fire during these short periods is determined by two factors. The first is the technical density of fire, i.e., the number of bullets or fragments per linear meter of the target area in one minute. The second is the accuracy of fire, which depends not only on the skill of the riflemen but to a considerable extent on preliminary preparations—assignment of targets, measurement of distances, selection of reference points, etc.

An idea of the possible density of infantry fire both in defense and in attack can be obtained from the following calculations. A rifle battalion of average strength usually defends a sector with a front of 2,000 meters. Its frontage in attack is 500 meters. Taking average figures for the number of weapons in a battalion (considering the normal wartime shortage) and the average practical

rate of fire, the average number of bullets and fragments released by a battalion within a minute will be as follows:

300 rifles firing 10 bullets each—3,000 bullets.

25 submachine guns, 50 bullets each—1,250 bullets.

3 heavy machine guns, 300 shots each—900 bullets.

16 light machine guns, 125 shots each—2,000 bullets.

6 50-mm mortars, 15 shots each, 200 effective fragments from each projectile—18,000 fragments.

3 82-mm mortars, 15 shots each, 300 effective fragments for each projectile—13,500 fragments.

150 hand grenades (thrown during the assault stage), 200 effective fragments per grenade—30,000 fragments.

The grand total, then, is 7,150 bullets and 31,500 fragments per minute, not counting 30,000 hand-grenade fragments used during the last moments at the expense of rifle fire. Thus the average density of infantry fire in defense will be three bullets and more than fifteen fragments per linear meter per minute, and during the support of attack, more than fourteen bullets and sixty-three fragments.

This purely mathematical calculation requires some correction with respect to defense. The attack is not conducted uniformly along the entire front, which enables the defender to condense his fire when firing at important objectives. Such a condensation

can just about double the density of infantry fire in defense. Taking this into account, we may assume that the density of infantry fire in defense is six bullets and thirty fragments per linear meter per minute; in attack, four-teen bullets and sixty-three fragments.

The figures for battalion weapons and manpower used above are arbitrary. They may change. But the strength of the battalion determines the width of its defense sector. Consequently, the average density of fire under conditions of normal saturation of the front will be approximately the same as above.

What will be the effect of this density of infantry fire in battle? Let us imagine the area in front of the defending rifle battalion split into corridors, each corridor being one meter wide. By maintaining the above mentioned density of fire, each of these corridors will be pierced by six bullets and thirty fragments per minute. It will take the enemy soldiers about one minute to cover the assaulting distance. Each soldier in assault averages three meters of front. This means that each soldier assaulting the position will be subjected to eighteen bullets and ninety fragments released from a distance not exceeding 200 meters, and in the last moments, point-blank.

The theory and practice of firing infantry weapons shows that not more than a single shot is required to hit a man-size target at a distance of 300 meters or less. This means that the defenders possess fire means with sufficient power to wipe out entirely the manpower of the attacking enemy. This power of infantry fire on the part of the defenders explains why a poorly prepared attack is repelled within a short time with great losses for the attacking side.

What, then, are the targets of the infantry fire in repelling attacks? First of all, the manpower of the attacker. Cutting off the enemy infantry from its supporting tanks, our infantry weapons hit it with *masse*¹ fires and, upon reaching the density of fire mentioned above, easily stop the attack. Systematically, our snipers destroy enemy officers, observers, messengers, machine gunners, accompanying-artillery gunners, and other im-

portant targets. Antitank rifles participate in repelling enemy tanks when they approach at a distance of 300 meters or less. Mortars wipe out concentrations of enemy soldiers advancing along the approaches to our defenses and destroy machine guns, mortars, and artillery guns—first of all, those which are closer to our forward edge and therefore more dangerous than the others.

It is quite obvious that in order to make the attack successful it is necessary to reduce the density of the infantry fire of the defenders to its minimum, and still better—to zero. During our attack it is essential to deny enemy infantry any possibility of conducting fire. During the preparation of the attack, the destruction of the fire means of the defending enemy, the destruction of his trenches, and the annihilation of his men are executed by artillery, combat aircraft, and mortars, and in the course of the attack, by tanks. However, in spite of the multitude and effectiveness of all these means of neutralization, it is only rarely possible to deprive the enemy completely of the possibility of repelling attacks by means of infantry fire, for if the enemy manages to save as little as twenty-five percent of the maximum density of his infantry fire, the attack is made difficult. That is precisely the time when well trained infantry should help itself with its own fire.

As far as mortars are concerned, the fact that they must support the infantry attack by firing over the head of their troops arouses neither doubts nor difficulties. This support is provided at all times and in all places. Machine guns, however, are often forgotten, and this in spite of their tremendous importance. It is true that the flat trajectory fire of the machine gun does not affect the enemy hidden in pillboxes and at the bottom of trenches. But the shower of this fire will not allow the enemy to leave the pillboxes; it will prevent his soldiers from rising from the bottom of their trenches and his commanders and observers from looking through embrasures and vision slots. Thus, well aimed machine-gun fire may pin down the enemy forces surviving aerial bombing and artillery and

mortar fires. Moreover, well organized machine-gun fire will prevent the enemy from firing from his trenches.

According to our calculations, heavy and light machine guns of a rifle battalion release 2,900 bullets per minute. During an attack on a 500-meter front, machine guns will have a fire density of about six bullets per minute per meter of the front. Fire of this density directed at the parapets or embrasures will prevent enemy soldiers from getting up. Machine-gun fire of high intensity is opened only before the very beginning of the assault and is delivered for a few minutes, until the nearest objectives of the assault have been taken. For subsequent assaults of new objectives in the depth of enemy defenses, machine-gun fire has to be organized anew.

The difficulty in organizing machine-gun fire arises from the fact that it should be conducted through the gaps between our attacking units and from firing positions located at or near the assault line (within assaulting distance). On the other hand, the task is facilitated by the fact that only a part of the front is to be taken under machine-gun fire, or only those objectives which remain intact by the end of our artillery and mortar preparation. Here arises the problem of the use of infantry weapons in the general fire plan, both in defense and in attack. In this general fire plan all types of infantry weapons should be given definite missions as to objectives, time, and methods of execution, and the commanders of all infantry units should make all the necessary preparations for the successful completion of these missions.

In the spring of 1915, the 70th Riazhskii Infantry Regiment was preparing to attack the Germans on a front of approximately one and a half kilometers. The distance between the trenches of the regiment and those of the Germans was about 800 meters. The area in between was a meadow, partly marshy and partly covered with small shrubs. The Germans had full-profile, continuous trenches with overhead covers; they fired from em-

brasures, and were protected by two rows of barbed wire. Reconnaissance had found out that the enemy had a well organized system of rifle and machine-gun fires. Only four batteries with an insignificant amount of ammunition were detailed for the support of the Riazhskii Regiment. Consequently, it was obvious that the enemy defenses could not be neutralized by artillery fire. The regimental commander decided to do it with his machine guns. After a thorough reconnaissance the following plan was worked out. During the night preceding the assault, seventeen heavy machine guns (most of them captured) secretly advanced under the cover of a strong reconnaissance force and occupied firing positions in the bushes within 200 or 250 meters of the German trenches. They prepared fires for German embrasures, and each machine gun was assigned a definite sector and provided with from twelve to fifteen cartridge belts. At dawn, three battalions left their trenches and moved toward the enemy. The Germans gave the alarm. They rushed to the firing posts, but at that moment our machine guns began firing. As an intense fire was raging around the embrasures, the enemy soldiers, dumfounded and perplexed, lay down at the bottom of the trenches. The regiment lost only fifteen or twenty men. It pierced the enemy defenses, advanced successfully, and took up to 2,000 prisoners.

A similar episode took place during this war. In one sector of the front the regiment of Colonel Babadzhanyan was about to attack the Germans. They occupied well equipped trenches. In addition to the artillery fire, Colonel Babadzhanyan secretly displaced all his machine guns to advance positions, and each of them was assigned a well reconnoitered target. Our machine guns did not let the Germans fire a single shot at our attacking units. The Fascists were caught in their trenches and wiped out.

These episodes taken from two wars show the irresistible power of infantry fire, provided it is well organized. This power should be used still more skilfully and in a fuller and more extensive manner.

The Battle for France: Other Terrain—Other Tactics

Translated at the Command and General Staff School from a German article by Captain Ritter von Schramm in *Völkischer Beobachter* 21 August 1944.

THE hedges and embankments, the rocks, the stone fences, and the sunken roads of Normandy have been blessed as well as cursed by the German soldier during the last ten weeks. They conceal him from the eyes of the enemy, they are the helpers of the grenadier in close combat and surprise counterthrusts, they serve to hide the nests of resistance and smaller concentrations of local reserves—but at the same time they make it impossible to obtain a view of the field of action and often limit the field of fire to the shortest of ranges. For the same reason, they render it easier for the enemy to push forward with his forces and infiltrate into our positions, especially at night or with the aid of smoke screens or natural fogs. The tankmen know full well how hard it will be to conduct attacks of any major type and make any advance in case of counterattacks in this closely woven network of walls and thick hedges. Generally speaking, this Normandy terrain offers opportunity enough for concealment, but what good is concealment alone against the ever recurring barrages and the area bombing by hundreds of bombers?

During the months of June and July our men had developed tactics of their own in Normandy. On the part of the Germans it was one of positional warfare and successful defense—without any actual positions, properly speaking, or continuous lines of trenches. Our men often lay stealthily under cover in wait for the enemy, ready for him when the decisive hour of the attack should come. They often drew back, then charged forward again within the narrow areas, or stubbornly held their ground in foxholes wherever the Normandy rock, just under the grass roots and the thin layer of soil, permitted any such excavation. A few silent fieldpieces and machine guns, a handful of men with heavy weapons and hand grenades, that neither bombs nor barrages had been able to put out of action—and not

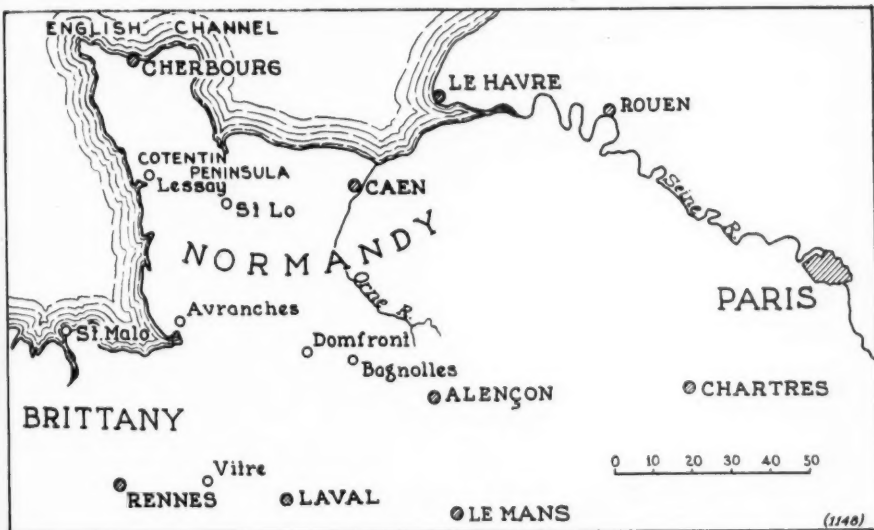
infrequently, even major enemy attacks had gone to pieces on their account. To be sure, in preparing for the invasion, the English and Americans had practiced for months—yes, even for years—in a nearly identical terrain on the other side of the English Channel. But we had also done this, in this very terrain, at least as far as the units stationed here were concerned; and so, after all, the German soldiers understood better the value of identifying themselves with the brush and hedges. Within a very limited area the combat often surged back and forth, but the front as a whole scarcely changed at all and in many places became wholly stabilized.

It was no wonder that the English and Americans strove for freedom of movement. The invasion area was becoming more and more packed with soldiers, guns, and tanks, all waiting to move ahead. But in spite of his growing strength, the enemy was still trapped in this network of embankments with their thick hedges and high stone fences. Only on the plains of Caen did there appear to be more freedom of movement. But the German armored and Elite divisions were stationed there, and the English were hardly making any progress at all against these even in the open terrain. A change over to a major offensive action over the whole extent of the front was necessary if an escape was to be effected from the hedged terrain, from the close shackles of the Normandy area.

And so the Americans, in addition to the English, have switched, since the beginning of July, to a general attack. They have made much less use of their masses of manpower—like the Soviets on the eastern front—than their masses of aircraft and artillery. When they failed at Caen, they tried to break through our front in western Normandy in a terrain in which, owing to its broken character, German tanks and assault guns were less plentiful and, at the same

time, less effective. If the German front could not be broken through in a frontal attack, it must be weakened by hammering blows and finally ripped open at the weakened spots. This was the purpose of the heavy and continuous American attacks, of the steadily increasing artillery bombardments, of the veritable cloudbursts of bombs

deeper penetration of the German positions was effected west of St. Lo. Through this breach poured several divisions of the enemy's forces and, by the beginning of August, Avranches, at the foot of the Cotentin peninsula, had been reached. Our forces succeeded in narrowing the corridor that had been cut by the enemy, but the sluiceway



SKETCH SHOWING LOCATION OF PLACES MENTIONED IN THE TEXT. THE SCALE IS IN MILES.

several times a day and during the nights. From St. Lo as far as Lessay on the sea-coast, the German positions were subjected to a ceaseless deluge of fire. But in spite of this, in the first of the battles in western Normandy, which lasted from 3 to 17 July, the Americans did not gain their objective, were not able to effect a breakthrough of the German front.

But several days later a new battle began here. The Americans increased still further the intensity of the action. They brought up still other batteries and now began to fly a considerable portion of their pursuit plane sorties and launch their bomber attacks from bases on the Cherbourg peninsula. Under these continuous blows, the German defense was worn down. Thus, by the end of July, a

still remained and through it poured powerful enemy armored and reconnaissance forces to the south, to the east, and to the west into Brittany, in the direction of Rennes and into the departments in the south portion of Normandy.

A new phase in the operations in the west began as a result of these events, a phase different from that which had just passed. It no longer had to do with the first landing and with the subsequent war of positions among the hedges and sunken roads. It was now a war of movement, at least on the German south wing of the invasion front. In the face of the strong American pressure, this south wing was forced to yield and bend back. In Brittany, fighting broke out over the fortified works and strongpoints; first

and above all, over St. Malo. At the same time, strong enemy forces turned eastward from Rennes, and rolled ahead at a rapid pace past Vitre and Laval.

During the first week of August the operations in the west took on an entirely new character. From a war of positions, a complete changeover was made to a war of movement in an open area. From Rennes on, the American mechanized formations, leaving the hedge and embankment-covered country farther and farther behind them, were able to bypass the natural obstacles of the hills of northern Normandy and to come out to the south of the great forests of Domfront, Bag-nolles, and Alençon. On they rolled without opposition. By 4 August they succeeded in penetrating into Le Mans and in seizing possession of the area about the city where were located the battlefields of 1870. But simultaneously, German countermeasures in these regions began anew to take shape and effect.

From the Le Mans area, the main drive of the Americans was continued in a northerly direction. It was obvious that they were making a wide circle around the German left wing and planned to attempt a great operational envelopment. Hence, soon after this, they plunged ahead as far as the city of Alençon, and occupied the area about it. At the same time they succeeded in gaining possession of the western edge of the Chartres plain, moving along it farther northward and northeastward. But the enemy advance in this region has become slower owing to the growing strength of the German forces that are being sent to block it. As a result of all this, operations have been transferred to a terrain where there are no longer any fat milk cows grazing between hedges but where endless fields of golden grain greet the eye. Involuntarily, one is reminded of that other landscape of central France where thirty years ago a seemingly irresistible advance was brought to a definite halt.

Since the beginning of August an entirely

new strategy has been evolved in southern Normandy. To be sure, the Americans have been successful in the initial breakthrough operation. It is true that they have been able to gain possession of broad areas and to make the initial moves in an enveloping movement. But the battle is not yet decided. Both sides are faced with new and great problems in consequence of this situation, with new tactical as well as operational problems. The battle in southern Normandy is still to be decided and one thing is sure—on the German side it will be waged with new formations. It cannot yet be predicted what forces will decide the day in these coming battles. In the area west of Chartres are broad, open battlefields, less suitable for a war of position than one of movement. It must not be assumed that the Americans are greater masters of this type of warfare than we, even though they do have an abundance of good equipment. But the better military knowledge and experience, in any case, is clearly on the German side, while the mass of the American troops and their commands are not yet proven in the open field. Truly, however, as a result of the present situation, we will still see critical hours and tense situations.

The operations in the west, in August, present a double aspect. In northern Normandy, on the German right wing on the Orne, it continues, in the main, to be a war of positions; but in the south it must be conducted with operational skill and in accordance with operational ideas. Also, new combat tactics suited to open terrain must be developed here. But our command and our troops have so far remained masters of these particular tactics even in the face of great enemy superiority. The general stabilization of the eastern front during recent weeks is proof of this. In the west, also, the coming struggles have like aims, and like decisions will be worked out.

The Sniper

An article by Lieutenant Colonel R. E. W. Johnson in *Aim*, army magazine of the British Middle East Command.

WHAT is a "sniper"? Press and other reports of actions almost invariably refer to "enemy snipers"—but it seems that often what they really mean is just good shots armed with standard enemy weapons.

A sniper is more than that; he must be (a) a marksman—not just a "good shot"; (b) armed with a specially accurate rifle with which he is fully acquainted; (c) skilled in fieldcraft, camouflage, and stalking; (d) courageous, self-reliant, and patient.

Such a man cannot be trained from "scratch" in five minutes—or in five weeks for that matter.

Let us consider for a moment the job of the sniper. What is he expected to achieve? Broadly speaking, three things:

First, he must be capable of guaranteeing a hit, four times out of five, with his first and only shot, on a target as small as the lower half of the human head at any distance up to 300 or even 350 yards in almost any conditions of light and weather. This is his primary task; the task of the hunter and killer.

Secondly, he must be able to harass, by accurate fire at ranges up to 1,000 yards, enemy parties or individuals who are foolish enough to expose themselves in his field of view. An experienced sniper will not only harass, but will reckon, with luck, to score a fair percentage of hits even at these longer ranges. (In point of fact, there are cases on record of hits on individual men at ranges up to as much as 1,700 yards.)

Thirdly, because he will be in a position to observe enemy activity, the sniper should be able to report information on enemy movements clearly and accurately and thus act on occasions as an extra "eye" for the battalion intelligence officer. This function, however, is the modern sniper's only contact with the Intelligence Section. He will be trained by the WTO [wireless telegraphy officer] and will

work under the orders of the battalion or company commander, and his use as an observer will be only secondary to his two main tasks, which entail accurate shooting first, last, and all the time.

It follows from the above that no man can be called a sniper unless he can shoot—and shoot really well. It is therefore essential that men selected for training as snipers should be marksmen first of all and stalkers and camouflage experts afterwards. A good shot can much more easily be taught fieldcraft than can the expert scout be taught marksmanship. This is a fundamental truth, and those who refuse to admit it will, in the end, have to "learn the hard way."

Having, therefore, started with your marksman—a man who can be relied upon to put all his five shots into a four-inch group at 100 yards with the ordinary issue rifle nine times out of ten and into something less on about four or five of those occasions—what else is there which he must possess or acquire to fit himself for this exacting job? Well, he must have good sight and hearing, he must be noticeably better than most men at judging distance, he must be able to estimate wind allowances with more than ordinary accuracy, and he must be well acquainted with the alterations to elevation which can be caused by different kinds of ammunition, changes in light, or in height above sea level.

He must be patient; he may have to wait a long time in order to get one "kill." He must know how to search for his quarry, what to look for and where to look. The more he knows about fieldcraft the better. He must let no unusual sight, circumstance, or occurrence escape him and must not be satisfied merely to report such things or to make a mental note of them, but must be inquisitive and attempt to discover or reason out the why and wherefore of anything out of the ordinary.

What kit does the army provide for such a

paragon? It gives him the Equipment, Sniper's Rifle, which consists of the following items:

a. A specially selected and adjusted No. 4 rifle guaranteed to group into about two inches at 100 yards.

b. The No. 32 telescopic sight. The present model is the Mark I, but an even better model, the Mark II, is on the way and should be finding its way to units before long.

c. An observing telescope, known as the Telescope, Scout Regiment.

These three items are kept, when not in use, in the Chest, S.A., No. 15, Mark I, because they are precision instruments and must be treated as such. The sniper will have to learn how to look after them and must always take particular care to avoid damage to them.

Why, it may be asked, have two telescopes? Cannot the telescopic sight be used for observing and thus save weight? The answer is that the magnification of the No. 32 sight is three, whilst the scout regiment telescope magnifies twenty-two times.

The chief object of the telescopic sight is not so much to magnify the target as to clarify it under service conditions, poor light, and so forth, and to put the target and the foresight in the same focal plane, thus allowing the firer to do what his eye cannot do unaided; that is, to focus, at the same moment, two objects at very different distances (i.e., the foresight and the target). Its magnification is therefore low and it is accordingly unsuitable for searching and observing, for

which the scout regiment telescope is particularly designed.

Another reason for providing a separate telescope for observing is that the sniper will be well advised to have with him, whenever possible, another sniper, or at least an intelligent member of the subunit nearest to his location, to observe the results of his shooting and to relieve him of some of the strain of having to be on the *qui vive* for long periods whilst waiting his chance of a target.

In addition to the above "tools of his trade" the sniper will usually be supplied with some form of camouflage overall, or he may be provided with materials and told to make up suitable garments for himself. What else will he wear besides this "cloak of invisibility"? More or less whatever he feels is suitable for the occasion, but he is almost certain *not* to want his steel helmet, since its regular outline will be spotted far too easily, nor full web equipment. He will probably feel more comfortable and be able to move around more easily if he puts his ammunition in one of the inside pockets of his blouse and only carries his rifle with its sighting telescope and his observing telescope.

An intelligent soldier thus armed and equipped will be a potential menace to any man incautious enough to expose himself unduly within "killing range" (i.e., up to about 350 yards), and if he is employed intelligently his value as a killer and harasser will be quite incalculable and should make the task of his unit appreciably easier, whatever that task may be.

Cooperation Between Artillery and Aviation

Translated at the Command and General Staff School from a Russian article by Lieutenant Colonel N. Denisov and Lieutenant Colonel V. Smirnov in *Krasnaya Zvezda* (Red Star) 19 March 1944.

ON one of the sectors of the front, breakthrough operations were in progress. At the appointed hour our aircraft appeared over the enemy's forward edge. According to the initial plan this flight had to precede the beginning of the artillery preparation. But

because of the bad roads, the tanks were unable to occupy their position of departure on time. The command decided, therefore, to delay the attack and, consequently, the artillery preparation for half an hour. Thus, there appeared a time interval between the

first blows of the aviation and those of the artillery. Later on, during the artillery preparation, a group of Stormoviks flew right through the trajectory zone, and our artillery had to cease firing to avoid hitting our own planes.

In the last analysis, our neutralization fires were effective enough to enable our infantry to capture the first line of the trenches, but the results would have been greater had the aviation and the artillery carried out their plans with more precision. The whole trouble was that the airfields had not been notified on time about the change made in the plan of the attack. The operations against the German centers of resistance were therefore not coordinated, and the breakthrough of the defense required more effort than had been anticipated.

Another deficiency disclosed in the displacement of the artillery was the lack of reliable protection from the air. Enemy bombers attacked the columns of our artillery battalions at the time when they were on the march. A delay resulted, and the artillery was unable to occupy its new firing positions at the appointed time.

The next day the staff of the unit considered all these mistakes, the attack was better organized, and its tempo was accelerated.

Operations of the artillery and of the aircraft should be coordinated and subordinated to the general plan of the battle. This coordination depends, in our opinion, on the nature of the operations of the infantry and tanks during the various periods of the battle. Three such periods may be distinguished: artillery and aerial preparation of the attack; fire support of the infantry and tanks during the attack; and support of the battle in depth until the main mission has been accomplished.

Preparation of the Attack

During this phase of the battle the operations of the artillery and the aviation may be planned in detail. Flights of assault and bomber aircraft, carried out correctly and coordinated as to time, place, and target with

the activities of the artillery, form the basis of cooperation of these two arms.

It happens sometimes that our aircraft (bombers and Stormoviks) and the artillery are assigned the same sectors of enemy defenses. By doing so, the fire power of the aircraft is not utilized to its full extent. Such an overlapping of two types of fire has two disadvantages. First, it involves an unproductive expenditure of forces and means, and second, it creates the danger of leaving a series of important objectives in the enemy defenses untouched. Battle experience shows that the greatest effect of the combined aerial and artillery action against the enemy during the period of preparation of the attack is attained when the aviation fire is not superimposed on the artillery fire, which is directed at the forward edge of the enemy defenses, strongpoints, and artillery positions. The mission of the aircraft during this period is to supplement the artillery fire, i.e., to destroy or neutralize the manpower and matériel in the depth of enemy defenses which cannot, for one or another reason, be reached by artillery fire. These targets are so hidden by the terrain features that the adjustment of artillery fire from the artillery observation posts is either impossible or too difficult. Other targets may be so distant that they are beyond the range of the artillery. Under normal conditions prevailing during a breakthrough of enemy defenses the targets which can be destroyed by artillery fire should not be given to the Stormoviks or bombers. It is different, however, when the artillery and aerial preparation is to precede a breakthrough of a strongly fortified defense. In this case, as in the massed blows from the air immediately preceding the assault, the Stormoviks and bombers will have, at times, to supplement the action of the artillery and bomb the same targets.

Coordinated actions of the artillery and aircraft during the period of preparation of the attack depends largely on the strict observance of the timetable for the sorties. The artillery preparation, as is well known, lasts from half an hour to two or three hours. The intensity of fire during this period varies.

Cooperation of the artillerymen with the fliers should be based on utilizing the time intervals when the artillery fire is less intense for blows from the air. The enemy defenses will then be kept under an uninterrupted fire action.

Organization of cooperation between artillery and aviation as to timing requires a special accuracy in the control of battle sorties of Stormoviks and bombers. The effectiveness of aerial blows is sometimes measured by the length of time the Stormoviks and bombers stay over the battlefield. Of course, the more sorties are made by our fliers, the longer will the enemy be under strain and the lower will be his morale. However, an accurate "volley" blow by a considerable bomber force, inflicted in one or two sorties at the moment when the intensity of the shellfire slackens somewhat, may also be very effective. The main thing is to inflict aerial blows at the right time, in full accordance with the timetable of the battle and with the utmost punctuality. If, for example, Stormoviks appear over the battlefield a little earlier than anticipated and at a different altitude from that planned, they may unwillingly disrupt the plans of the artillery. The artillery, to avoid hitting its own planes or because of the difficult observation (bomb bursts undoubtedly lower visibility), will cease firing without having completed its fire missions.

As a general rule, the artillery and aerial preparation fires are climaxed by the massed use of all fire means. For the aircraft, this period is characterized by a massed attack of bombers and Stormoviks on the forward edge of the enemy defenses. Probably the most effective form of cooperation at this time would be brief aerial blows delivered from altitudes sufficient to avoid being hit by shell fragments. Such a brief but strong artillery and aviation action will enable the infantry and tanks to pierce the forward edge and to penetrate into the depths of the defense. Here begins the period of support of the attack.

Support of the Attack

This period of the artillery attack begins,

as is well known, when the infantry launches the assault. The artillery is charged with the mission of securing the advance of the infantry from the line of departure for the assault (100 to 200 meters from the forward edge) and the capture of the forward edge of enemy defenses. Here the artillery has to transfer its fire into the depth. In order not to slacken the action exerted on the enemy defenses, all flights during this period should be well timed so as to reinforce the direct fires of the accompanying artillery, which is engaged in the destruction of new targets or those which come to life after having been silenced by the artillery preparation.

Besides, the enemy may use his artillery batteries to shell our attacking infantry. Experience shows that in order to break our assault the Germans often fire on their own forward edge even when their men are still there. A very important mission of the aircraft during this period, therefore, is to find out which enemy batteries have not been neutralized during the artillery preparation and to attack them from the air.

The artillery can, on the other hand, help the aviation when Stormoviks attack the forward edge of the defenses. For this purpose, some of the long-range guns should be assigned to neutralize the antiaircraft means of the enemy by opening a withering fire immediately before the aerial attack and by directing systematic fire at the antiaircraft batteries when the Stormoviks are already in the air. A skilful escorting by fighter planes will enable the artillery aviation to adjust the fire on targets which cannot be observed from the ground.

It is very important that the action of the aviation be uninterrupted during this period of the attack. Not infrequently the capture by the tanks and infantry of the forward edge of the enemy defenses takes a long time, and one or two flights of the Stormoviks may prove insufficient. The aviation commander as well as the artillery commander should, therefore, have at their disposal a certain reserve force which, even without having participated in the massed fires opening the attack, could be utilized during these critical

moments of the battle. The methods of using these artillery and aerial reserves as well as cooperation problems should be worked out in advance.

The Battle in Depth of the Defense

After the capture of the forward edge of the enemy defenses the control of the artillery is usually decentralized. The artillery commander of the unit retains only part of heavy artillery battalions for the continuation of counterbattery fires and for securing the commitment of mobile groups into the breakthrough sector. During this phase of the attack cooperation between the artillery and the aviation is characterized by the following: First, the impossibility of anticipating the course of events calls for assigning missions by zones, and the aircraft are called upon to prevent the approach of enemy reserves, concentrate on the targets which are beyond the range of the artillery (more than ten or fifteen kilometers away), etc. Second, it will be necessary to organize joint consecutive blows upon enemy strongpoints delaying the advance of our infantry and tanks. In addition, our battle formations should be protected by box barrages in the event of counterattacks.

Aerial attacks on remote targets are decided upon independently by the aviation commander after a personal estimate of the situation. However, operations against enemy strongpoints or repelling of counterattacks require close coordination of all the measures taken by the artillery and aviation commanders. This insures coordination and the accomplishment of all missions in accordance with the general character of the battle. The bombing of a surrounded strongpoint or center of resistance will be of little use if not followed by a decisive action of the ground troops which for some reason or other have postponed the assault. And inversely, a thoroughly planned and carefully executed attack of the surrounded sector, both from the ground and from the air, paralyzes the resistance of the enemy and his fire means. This helps our infantry to liquidate the enemy strongpoint more rapidly and with smaller losses.

The battles for overcoming the second defense zone of the enemy and the organization of pursuit are closely tied in with the displacement of our artillery (by echelons). The aviation, by its action, is able to accelerate and facilitate the displacement of the artillery battalions. By reinforcing its assault and bomber groups, it is able to compensate for the natural weakening of the artillery fire caused by the partial displacement of the batteries. Fighter planes should protect marching artillery battalions.

It is obvious that there is a wide variety of common problems in which the officers of both artillery and aviation are equally interested. Joint solution of these problems will undoubtedly affect the course of the operation as a whole. How should battle cooperation be accomplished in practice? It seems to us that only an impartial estimate of their capabilities, without any reference to the usual difficulties, will provide both arms with a solid basis for a common planning of the forthcoming operations. Personal contact before the battle and during the battle will facilitate the introduction of timely corrections in the plan. Experience has shown, by the way, that the presence of a representative of the aviation at the observation post of the artillery commander is fully justified.

The senior commander should realize the necessity for close and consistent cooperation of the supporting aviation with the artillery and assign the former only well-defined missions.

Confidence between officer and man is possible only when the officer sets the example in all things.

—From "Thoughts on the Training of German Soldiers,"
by a Captain in the German Army.

New German Antitank Weapons

Translated at the Command and General Staff School from a German article by War Reporter Walter Serocka in *Berliner Börsen Zeitung* 11 August 1944.

SOME time ago, on the occasion of the destruction of a large number of Anglo-American tanks on the Normandy front, the two latest weapons to come into the possession of the German armed forces for the combat of tanks, the *Panzerfaust* [tank fist] and the *Panzerschreck* [tank terror], were announced. Both weapons probably participated to a large extent in the destruction of more than a thousand enemy tanks during the first four weeks of the invasion. Once again the employment of new weapons has been announced, and this, following shortly after the announcement of the latest German tank, the "Panther," and the long-range weapon, the "V-1," testifies to the constant activities of our technicians and armament workers. On the battlefields of the east and in the massed charges of the Soviet tanks, the ideas for the two weapons, *Panzerfaust* and *Panzerschreck*, were born. These weapons now are giving a good account of themselves on the eastern, southern, and western fronts.

At the beginning of the campaign against Bolshevism only the usual weapons used in the combat of tanks were available, but it soon became evident that these weapons alone were not enough to halt the gigantic material onslaught of the Soviets. Courageous men rushed forward against the tanks and destroyed them. The individual tank fighter was the heroic prototype for whom, as far back as the year 1941, the tank destroyer's decoration was created. Concealed in holes, these men allowed the tanks to approach them, and then attacked them. Sighting instruments and vision slits were obstructed, and the tank, thus blinded, was rendered helpless against all further attacks. The guns were made useless by means of hand grenades shoved into their barrels. Wrecking of the treads by means of explosives made movement impossible for the tanks, and by means of "Teller" mines, tur-

rets were blown off the body or armored walls were pierced. All of this represented nothing but improvised methods for combating the tank, which can be vitally struck only when the armor is pierced and the crew destroyed. In the *Haftohlladung* [magnetic hollow-charge mine] the means was provided for accomplishing this. This mine is a conical arrangement of sheet metal, in the handle of which—in a manner similar to that in the hand grenade—a fuze with its actuating device is located. The individual tank combatant rushes at the tank and places the mine against the turret or walls. Magnets hold the charge firmly against the steel plates, where it explodes after a short time, piercing the steel.

An entirely new method in the manufacture of explosive devices was entered upon in the construction of these mines. While in the case of a bomb or shell, the explosive is packed solidly in the interior of a steel container, in the case of the hollow mine—as the name itself indicates—it is arranged in the form of a hollow hemisphere. In all other explosive devices and explosive bullets, the gases spread uniformly in all directions when the explosive is ignited. In the case of the hollow mine, however, they unite in a single point in a manner similar to that of light when it passes through a lens. They act, therefore, with concentrated force on a small area of the armor plate, penetrate it, and hurl the fragments from the hole into the interior of the tank, where with their high velocity they act as deadly missiles. It is a peculiarity of the hollow mine that it acts the more effectively the thicker the armor plates that are to be penetrated, since just that many more fragments will be hurled into the interior of the tank. The enemy has attempted by various means to protect himself from this type of mine. He has provided the walls of his tanks with a ribbed surface, and has covered them with a

layer of concrete or with sheets of plywood. This has limited the employment of the mine, but in the *Panzerfaust* a new and more effective weapon has been found.

In the case of the magnetic mines, the individual fighter is obliged to risk the rush

amount of material employed make the *Panzerfaust* a valuable and low-cost weapon.

In view of the mobility which characterizes modern combat operations, however, it soon became evident that in addition to the *Panzerfaust*, another weapon was needed for



LEFT: THE "PANZERFAUST" (TANK FIST), AN INFANTRY WEAPON FOR COMBAT AGAINST TANKS. THE MISSILE IS SAID TO BE EASILY ABLE TO PENETRATE ARMOR PLATE 100 MILLIMETERS IN THICKNESS.



RIGHT: THE "PANZERSCHRECK" (TANK TERROR), A WEAPON SIMILAR IN PRINCIPLE TO THE "PANZERFAUST" BUT LARGER AND POSSESSING A LONGER RANGE. "ITS LIGHT WEIGHT IS A GREAT ADVANTAGE, AS IT CAN BE CARRIED BY A SINGLE MAN WHO IS ABLE AT ANY TIME TO OPEN FIRE WITH IT. THE PROJECTILE IS DISCHARGED ELECTRICALLY BY MEANS OF A PUSH BUTTON."

(FROM "WOCHENSCHAU," ESSEN, GERMANY, 12 JULY 1944)

at the tank, which will perhaps result in his death. But in the *Panzerfaust* our soldiers have a weapon with which they are able to attack the tank at long range. The explosive device is inserted in and protrudes from the front of a tube. It is constructed on the same principle as the hollow mine. By means of a rocket charge located in the projection tube, this explosive device, the so-called "fist grenade," is fired. A sighting arrangement attached to the tube permits accurate aim to be taken at the enemy tank. The simplicity of construction and the small

dealing mortal blows at tanks at still greater range. With the introduction of the *Panzerschreck* this problem has now been solved. In this case, likewise, a hollow mine is fired from a tube. In contrast with the *Panzerfaust*, however, the rocket propelling charge in this case is located in the stem-like end [stiel förmigen Ende] of the explosive device. A sheet-iron shield protects the face of the gunner from any particles of the rocket propelling charge that may be hurled backward, and a sighting arrangement permits accurate sighting. The projectile leaves the

tube without recoil and in almost level flight and goes roaring with great velocity toward its target, leaving a faint trail of smoke behind it. Then, only an instant after its discharge, the roar of the explosion of the projectile is heard as it strikes its target. Outwardly, nothing but a small hole in the armored walls of the tank testifies to the destruction of the tank and its crew. As in the case of the *Panzerfaust*, the amount of material expended in the manufacture of the

Panzerschreck is slight, and manufacture is extremely simple.

With the new weapons in their hands, our soldiers, grenadiers, and men operating the *Flak* [antiaircraft artillery] look undisturbed at the material onslaught of our enemies in the east and west. The terror of the sight of approaching tanks which is felt by the unschooled soldier has long since transferred itself to the side of the enemy.

Organization of River-Forcing Operations

Translated and digested at the Command and General Staff School from a Russian article by Major General A. Blagodatov in *Voyennaya Mysl* (Military Thought) May-June 1943.

THE forcing of large water barriers requires a variety of special crossing equipment. The number of troops and the amount of matériel able to cross a water barrier at one time depends on the availability of crossing points and crossing means. This compels the attacking side to accumulate its equipment and forces and commit them in battle on the other side gradually. Consequently, in the event of enemy counterattacks, our troops are exposed to the danger of being defeated piecemeal. The possibility of using tanks and armored cars is limited, and the commitment of massed tanks into the breach with the first infantry waves becomes impossible. All maneuvers originating from the depth of the battle formation are difficult, especially the direct artillery support of the infantry. Communication with the rear is made difficult because of the limited number of crossing points, and this complicates the problems of supplying the troops with ammunition and the evacuation of the wounded. Crossing points are very vulnerable to artillery and aircraft fire, and this endangers communications with the rear.

The crossing of wide water barriers has a number of peculiarities, as follows: unusual width of crossings requiring the use of motorized crossing means; great demand for bridge equipage limiting the number of

bridges to be constructed; considerable effect of the wind on the speed of crossing; difficulties in observing the progress of the crossing and the enemy, and in providing artillery support to the troops already ferried across; possibility of using armed boats and cutters by both crossing troops and defenders; necessity of strong aerial protection of the crossing.

Night crossing requires particularly careful preparations and a thoroughly organized reconnaissance. Preparations for a night crossing will require special measures: detailed command reconnaissance, accurate calculation of time and distances carried out on the ground, measures for securing orientation (landmarks on roads and calculation of the azimuths of the assigned directions); preparation and organization of special means of communication; special measures for concealment and camouflage of troop activities; adaptation of equipment and transport for night use. The objectives of a night attack should be well defined along the front and in the depth, and be well discernable in darkness. A crossing once started should be continued even under strong enemy fire. The laying of bridges at night may begin before the troops of the first echelon have occupied the assigned ferrying line. If, however, the bridge is not finished by dawn, immediate

measures for antiaircraft defense and for smoke screens must be taken.

The crossing of a water barrier on the bank of which our troops have stood against the enemy for a long time should be organized so as to take maximum advantage of the element of surprise. The preparatory measures should be executed so secretly as to prevent the slightest suspicion on the part of the enemy.

The element of surprise is very important in crossing operations. The weak point of the attacker in forcing a river is the slow deployment of his forces on the other bank. The element of surprise helps to gain time for deployment. Surprise is attained by the secrecy of preparations, by crossing on a wide front, by staging demonstration crossings and troop movements, by accelerating the tempo of the crossing, by careful organization, and by skilful maneuvering of the crossing means. To attain surprise, the crossing, in many cases, may be carried out without artillery preparation, at night, under conditions of limited visibility, or under cover of a smoke screen.

There are many examples of the use of smoke screens in forcing rivers in the daytime. Units of the "X" Infantry Division, for example, attempted to cross the river Neva on the night of the 22 and 23 October near Nevskaya Dubrovka. This crossing, however, was not a surprise to the enemy. The sector of the crossing was continuously lit by rockets, and the troops had to operate under intense enemy fire. Ferries and barges were knocked out and the crossing proceeded very slowly. As a result, the commander of the group decided to force the crossing in daytime under the cover of smoke. Smoke was released from two points and was effective for six hours. The use of smoke was quite a surprise to the enemy. For the first forty or forty-five minutes the Germans did not fire at all, then fired at random without causing serious losses to our troops.

Whenever a river cannot be forced secretly, the crossing is effected openly. This method is used under the following conditions: considerable superiority in manpower, artillery,

and aircraft; availability of considerable crossing means; favorable terrain; weakened resistance of the enemy. Frequently, crossings are made under enemy fire even at night, since the defenders use searchlights and flares to illuminate crossing points. That is the reason why the forcing of a water barrier is, as a rule, preceded by a preliminary artillery and aerial preparation and is supported later on by continuous artillery and aircraft fires. This is needed for the neutralization of enemy artillery and mortars firing at the crossing. When, to effect tactical surprise, the river is crossed without artillery preparation, both the artillery and infantry fire means should be ready to neutralize enemy firing positions at the signal of the senior commander.

Night crossings with preliminary artillery preparation are made when enemy defenses are directly on the river bank and when the vigilance of his outposts will interfere with the success of a sudden attack. In this case, it is necessary to advance the line of departure closer to the crossing area by the beginning of the artillery preparation. In order to avoid serious losses from enemy artillery and mortars, it is advisable to establish an area of concentration provided with shelters for troops and equipment.

Crossing fronts should be selected, as a rule, in the direction of the main effort or close to it. The selected front should have concealed approaches (woods, river tributaries, etc.) for bringing troops and equipment to the crossing, observation of the hostile area to a considerable depth (complete control of our bank and absence of natural cover on the enemy side), advantageous positions for fire means, and terrain favorable for the deployment of the first echelon on the enemy bank and for the establishment of the bridgehead.

From the technical point of view, the front selected for crossing should meet the following requirements: the width of the river, the speed of the current, the depth of the river, and the nature of the bottom should allow the completion of the crossing with the available crossing means within the allotted time; the banks of the river should not require con-

siderable earth work for the construction of approaches; the banks and valleys should not be swampy; the sector should have favorable approaches (such as gullies, tributaries, etc.) for bringing equipment; local materials for building the crossings should also be available.

The organization of the forcing depends largely on *the width of the river*. The wider the river, the stronger must be the first wave, as it will have to hold on longer on the opposite bank. On the other hand, when the river is very wide it is easier to surprise the enemy, for part of the equipment can be placed in the water under the cover of darkness. *The speed of the current* affects the duration of the crossing, the rapidity of the construction of bridges, their maintenance, and the use of light crossing equipage. *The depth of the river* determines the possibility of fording it by various types of troops. Besides, one should take into account the fluctuations of the river, i. e., the change of the level of water due to seasonal variations, weather conditions (heavy rains, strong wind), and the demolition of dams in possession of the enemy.

A river loop extending toward the attacker will enable the artillery to concentrate its fire against the opposite bank and secure the flanks of the first units crossing over. But when overwhelming artillery and aerial support and sufficient crossing means are available, it may be more advantageous to cross at the river bend extending into the enemy dispositions. The troops forcing the river will then be able to outflank the enemy and come out in his rear.

Preparations for the forcing of a river are basically as follows: clearing of our bank from enemy units and obstacles; reconnaissance of the river, the enemy defense zone, and the area of departure for crossing; planning the operation; concentration of troops in assembly areas and camouflage or concealment measures; preparation and concentration of equipment in the assembly areas and measures for their camouflage and concealment; preparation and training of the troops for the forcing of the river; occupation by

troops of the area of departure for crossing the river; supply and combat security of the area of departure.

Clearing the enemy and his obstacles from our bank and seizing the crossing points and retaining them until the arrival of our main forces is usually done by mobile groups reinforced by sappers. As a general rule, our bank of the river should be occupied by forces sufficient to prevent the enemy from conducting reconnaissance on our side and to insure the operations of our reconnaissance on the enemy's bank. The rest of the troops should be concentrated in assembly areas offering concealment from aerial and ground observation, and located at from four to eight kilometers from the water barrier.

Reconnaissance is conducted uninterruptedly. Before the commander makes his decision, he should receive the following information from the reconnaissance agencies: how the enemy defends his side of the river; whether the enemy main defense zone is located on the bank or whether the bank is defended by outposts with the main enemy forces in depth poised to prevent our crossing by counterattacking from the depth; the trace of the forward edge of the enemy advance positions and the forces and weapons at his disposal; depth of his position and its fortifications and obstacles; enemy defenses in the depth and forces and weapons in the defensive zone; location of enemy reserves and probable directions of their counterattacks; disposition and strength of enemy artillery and its observation posts; enemy tanks, if any, where located, their assembly areas, areas of departure, and the directions of their probable operations; river flotilla, if any, at the disposal of the enemy, its strength and composition; terrain in front of the enemy forward edge, and in its depth; location of most favorable approaches to enemy defenses.

On the basis of staff, engineer, and troop reconnaissance data, the commander works out a general plan of the river forcing operation.

Accompanied by the commanders of the various arms and services, the senior com-

mander personally reconnoiters the area. During this reconnaissance he determines definitely the location of crossing fronts, and the location of firing positions, decides on the approaches and areas of departure, and determines which terrain features are to be captured to secure the construction of bridges.

The commander's decision should anticipate, first of all, the purpose and the design of the battle. He determines what enemy group is to be routed or what objective is to be captured in order to insure rapid accomplishment of the assigned mission. This will determine the direction of main effort and the grouping of forces and weapons.

In forcing a river, it is sometimes difficult to maintain the assigned direction of the main effort through the entire depth of the advance. Because of the slow tempo of advance, which is a result of the necessarily gradual crossing of the forces, the enemy can bring reserves and organize a countermove in order to disrupt the forcing operation. The situation on the opposite bank may change to such an extent that a regroupment of our forces and the change of the direction of the main effort will be necessary. The mission of the main forces may be supplemented before the beginning of their attack, which may possibly require a new order.

The commander's decision also anticipates the order of establishing the bridgehead on the other bank, its depth, and the measures for its consolidation; battle formation of the troops and methods of crossing; organization of cooperation in the matters of artillery and aircraft preparation and support of the attack; order of crossing of the main forces and especially of artillery and tanks; measures of camouflage; organization of battle security, communication, and rear areas; location of the command post and its transfer to the other bank.

On the basis of the commander's decision the staff of the unit works out a *plan table* of the operation in which are planned the operations of the troops by phases of the forcing. There will usually be three or four phases: first phase—preparation of the forcing; second phase—the forcing of the cross-

ing by the first combat echelon, and the assault and capture of the bridgehead in order to secure the crossing of the main forces; third phase—crossing of the main forces and their preparation for advance and for the repulse of enemy counterattacks; fourth phase—advance of the main forces and exploitation of success.

The time table for the crossing reflects mainly the technical part of the operation. It indicates crossing fronts and when ready for crossing; what units are to cross and with what means of reinforcement; crossing points from which they will be ferried and the numbering of these points; order of crossing of the forward units; assembly areas, areas of departure, and time of arrival at the areas of departure; crossing means at each crossing point and methods of crossing; officers in charge of crossings; time of crossing for each echelon; reserves of crossing equipment; security measures (who supports whom, anti-aircraft defense, antitank defense, anti-chemical defense, measures of camouflage, signals, and special directives).

When making his decision, the senior commander should, first of all, consider the mission of the unit on the opposite bank, and the situation. On the basis of this, he then determines battle formation to be used and works out his plan of action. The river has a decisive influence on the battle formation. It must be taken into account that the accumulation of forces on the other shore will proceed gradually and that the control of the battle and the bringing up of supplies is difficult. Under these circumstances, regular battle formation may have to be changed, and the echelonment will depend on the availability of crossing means.

The strength and composition of each echelon depends on its mission. The mission of the first echelon is to overcome the enemy units defending the river bank, to establish a bridgehead for the deployment of the main forces, and to hold this area until the main forces—the second echelon—has been concentrated on the bridgehead and is ready for further attack. The strength and composition of the first echelon should be sufficient to seize

the bridgehead and to repel possible counterattacks by enemy reserves. Consequently, the wider the river, the deeper the bridgehead; and the stronger the enemy defense, the stronger must be the first echelon. If an enemy counterattack with tank support is probable, the first echelon must have a sufficient number of antitank weapons.

In order to secure the crossing of the first combat echelon, small infantry units, armed with submachine guns and antitank weapons, and sappers cross over first. After landing on the opposite bank, they destroy obstacles and suppress firing positions which have not been neutralized by artillery fire. Their operations are timed so as to achieve destruction of these objectives by the time the crossing of the main body of the first echelon starts.

The first echelon crosses the river on a wide front, deploys after landing, destroys all firing emplacements, and assaults the enemy forward edge if it is located along the bank of the river. In the event the enemy defense lines are from two to three kilometers from the river, the landing troops destroy combat security elements of the enemy, reach the line of departure, and attack.

The first combat echelon attacks the enemy and advances until it reaches a terrain feature, the capture of which secures the crossing of the main forces. Having captured this feature, the units of the first echelon consolidate their positions, reconnoiter enemy dispositions, and take measures to repel his counterattacks. Artillery must be ready to stop enemy counterattacks, and the aircraft must be ready to paralyze enemy reserves and to neutralize the batteries again coming to life after our artillery preparation. The amount of crossing means for the first echelon should be such as to secure its crossing within approximately an hour or an hour and a half from the beginning of the forcing, i. e., in two to three trips on small rivers and in one or two trips on medium and large rivers. A slower crossing of the first echelon may result in its partial destruction.

The depth of the bridgehead established by the first echelon should be sufficient to pro-

tect the crossing of the main forces from machine-gun and mortar fires, which calls for depth of about three or four kilometers, and to force the enemy to regroup his artillery. The advance guards, on the other hand, should not penetrate too far into the enemy position. They may be cut off from the artillery support from our bank and be gradually destroyed.

Crossing of the main forces follows the capture of the assigned terrain features by the first echelon. The same crossing equipment, and the same crossing points are used. The method of crossing of the main forces (by bridges or boats) depends on the nature of the river and on the situation. The bridge method is the fastest method of crossing. The construction of a bridge, however, requires considerable time, and besides, bridges are very vulnerable to the fire of enemy artillery and aircraft. Therefore, in deciding on the bridge method, the commander of the unit should carefully consider what is preferable: to cross on boats or to use all bridge equipment for the construction of bridges. The ferrying of the troops on boats will be used when the action of enemy artillery and aircraft and the limited amount of means of crossing precludes the construction of bridges or when the situation will not permit their construction. The plan of the crossing should, therefore, be flexible and anticipate the shifting from one method to the other.

The main forces of the division, as the crossing proceeds, prepare themselves to continue the offensive. The beginning of their attack depends first of all on whether or not the artillery fire is able to reach the second defense zone of the enemy. If it is necessary to transfer more artillery to the other bank and if conditions are unfavorable (wide river, limited means of crossing, strong fire of enemy artillery and aircraft), the beginning of the attack against the second defense zone may be delayed.

Upon landing, the units of the second echelon deploy within the bridgehead captured by the first echelon and begin to advance. In view of the fact that up to this time only the units of the first echelon are

engaged in battle, the crossing and the commitment of the subsequent echelons should be supported by massed artillery and mortar fires from our bank.

The exploitation of success and the depth of the attack depend largely on the timely crossing of the bulk of the artillery, its rapid occupation of the firing positions, and its ability to conduct massed fires. The commander and the staff of the unit should, therefore, strive to accelerate the landing of artillery and to coordinate the further troop movements with the action of the artillery already available on the hostile bank.

The role of artillery in forcing a river is incomparably greater and its missions are more important than in the usual attack of enemy defenses. One of the reasons for this importance of artillery is the fact that the employment of tanks in forcing a river is very difficult. Lack of artillery and difficulties in its employment may have a decisive influence on the plan of the forcing operation. This may result, for example, in the necessity of basing the success of the operation exclusively on the element of tactical surprise. The commander of the unit should, therefore, try to utilize his artillery as effectively as possible and secure favorable conditions for its employment.

Only in rare cases will the artillery succeed in supporting from its main firing positions the attack of the infantry through the entire depth of the battle. It may, therefore, be necessary in the course of the crossing to carry out another artillery preparation which will, in turn, necessitate forward displacement of all or part of the artillery, and its timely transfer to the other side of the river.

It is also very important to take into account the possibilities of the artillery and the length of the artillery preparation. It is natural that the less artillery is available and the stronger the defense of the enemy side, the more time will be required by the artillery to prepare the attack. On the other hand, the longer the artillery preparation, the less chances there are to attain surprise. This contradiction can be solved by the use of several groups of artillery using direct

fire. Simultaneous firing of numerous guns brought into open positions in several sectors disorganizes the enemy, and since the guns fire only for a short period, they can withdraw safely to their concealed positions upon completion of their missions. Experience shows that enemy mortars start firing twelve to fifteen minutes and enemy artillery twenty to thirty minutes after our guns start firing.

In working out a plan of the artillery action, one should take into account the fact that artillery and mortars in river forcing operations are, as a rule, more centralized than in regular attacks. In forcing a river by an infantry division on a wide front (more than eight kilometers), artillery and heavy infantry weapons are massed and centralized in the sector of the main crossing. Infantry fire means of the second echelon also participate in the artillery preparation.

The centralization of artillery and mortar fires should not affect the continuity and effectiveness of fire support of the infantry. The first echelon, therefore, should be supplied with mortars and some division artillery for the immediate support of infantry and light tanks. Experience shows that the failure of many crossing operations was due to the fact that the first echelons were not supported by artillery, which got stuck on our side of the river.

The principal mission of the artillery during the first phase of the battle is to crush enemy firing positions hampering the crossing of the first echelon and to protect the echelon from enemy counterattacks, particularly at its flanks. After the first echelon has captured the bridgehead and consolidated its new positions, and when the main forces begin crossing over, the principal mission of the artillery is to crush decisively enemy artillery positions.

The artillery supporting the infantry should be organized so that it may be able to use two-thirds of its strength at all times. This calls for timely displacement of observation posts and batteries and for reconnaissance and preparation of positions on the other side of the river.

The method of forcing a crossing by tanks depends on the nature of the water barrier, the strength and method of enemy defenses on the opposite bank, availability of bridging equipment, and the construction of the tanks. Tanks will be assigned the following missions: support of infantry advance guards in capturing the enemy bank; support of the first echelon in establishing the bridgehead; support of the advance of the main forces on the enemy bank; support of the advance units of the infantry by fire from our bank.

If the river is unfordable, heavy and medium tanks can cross only on boats or bridges and should, therefore, support the attack of the first echelon by firing from our bank. In forcing deep and wide rivers, the tanks are formed into a division tank group and are employed in the attack of our main forces on the other bank.

Battle experience shows that the amount of crossing means is usually insufficient, and it is necessary, therefore, to procure more from local sources beforehand. The amount of this equipment and its capacity should be sufficient to cross the first echelon and to continue crossing the main forces. The same equipment will be used for replacing losses during the crossing and for moving all equipment in the event the second echelon is to cross elsewhere. About fifty percent of the equipment should be held in reserve if the crossing is carried out with the organic equipment. If the crossing is effected by means of local equipment at hand, the equipment held

in reserve should comprise up to two hundred percent. Such a large reserve is necessary because light equipment made of local materials is usually left on the hostile bank.

The equipment reserve and the sappers should be echeloned in depth. Part of the equipment, approximately ten to fifteen percent (self-propelled, if possible) should constitute the maneuver reserve [literal translation] of the senior commander and be under direct command of the senior engineer commander. This equipment is used in the direction of the main effort or in those sectors where the attack develops successfully. The maneuver reserve is concentrated in the area of departure and in a place from which it can be easily moved to the main crossing front or other sectors where the success of the crossing is most probable. The rest of the equipment reserve is at the disposal of the regimental crossing fronts and in most cases in the rear of the main crossing front.

The success of the crossing largely depends on the skill of the troops in using the available equipment. Furthermore, each large water obstacle has a number of peculiarities to which the troops must know how to adapt themselves. A preliminary training of the troops is, therefore, essential, particularly for the units of the first echelon. The troops should be trained on a terrain similar to that in the forthcoming crossing and work with the same type of equipment that will be used later in combat.

British Rocket-Carrying Aircraft

From an article in *The Aeroplane* (Great Britain) 2 June 1944.

GERMAN rocket-carrying aircraft have at various times received a great deal of publicity, but the fact that the Royal Air Force has been using rocket projectiles for a long period and achieving better results with them than those obtained by the enemy was only recently revealed. RAF Coastal Command has been using these weapons in operational sorties against German shipping for the past twelve months.

The projectile employed by this Command is a formidable affair, about six feet six inches or more in length, with a sixty-pound high-explosive head and fairly large tail fins. The body of the rocket consists of a large-diameter, heavy-gauge steel tube filled with cordite, the cordite acting as a propulsive charge. Eight of these projectiles are carried beneath the wings of a Beaufighter, four on each side,

and the propulsive charges are fired electrically by means of a small platinum fuze wire.

The guides on which the rockets are mounted may be compared to the guns of a fighter, for the aircraft is sighted on to the target with a normal type of gun sight in the same manner as a fighter machine, but there is no recoil when the rockets are discharged, as they are self-propelled and the reaction of their high-velocity gas stream is taken up by the air. These gases, moreover, pass beneath the wing surfaces and do not affect the aircraft, which flies steadily on its course during the firing of successive rounds. The rockets can be discharged in pairs, one from each wing, or the whole eight may be fired in one salvo.

The very high degree of accuracy obtainable with this weapon has been found to more than outweigh any technical difficulties which may have cropped up in perfecting its use. Rockets are now employed by Coastal Command in preference to bombs for attacking small or medium-sized enemy supply vessels and also against flak ships. The last-mentioned present difficult bomb targets owing to their small size and formidable armament, but the rocket-carrying Beaufighters manage to deal with them most effectively.

Skip bombing from masthead height was formerly employed against these flak boats, but although much more accurate than bombing from higher levels, this practice entailed rather severe losses of aircraft and it was dropped in consequence. The rocket now does this job with success, for a much lower casualty rate. Rockets and torpedoes have in fact virtually replaced the bomb for all shipping strikes carried out by Coastal Command.

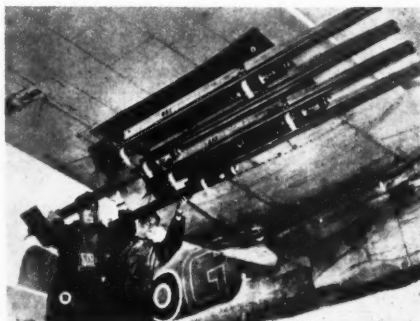
Torpedoes are employed against larger supply ships, because small ones have a relatively shallow draught and the torpedo is liable to run underneath them. Thus the small and medium German vessels are attacked by the rockets.

Considerable numbers of Coastal Command aircraft are detailed to concentrate on German flak ships, as these are often massed around a large supply vessel, the reason being that German shipping has become actually

irreplaceable as a result of Allied bombing attacks, conducted over a long period, on the enemy shipbuilding industry.

As many as fifteen or twenty flak ships will sometimes be found escorting a single large merchant vessel.

These shipping strikes by RAF Coastal Command are obviously linked up with the British and American railway-smashing campaign in western Europe. As railway transport diminishes, Germany is obliged to make more use of sea transport, but the sea becomes



LOADING ROCKET PROJECTILES INTO THE GUIDE RAILS BENEATH A BEAUFIGHTER'S WING. (FROM "THE SPHERE," LONDON.)

constantly more dangerous for this purpose. Moreover, German shipbuilding is now known to have been virtually closed down by our bombing.

British airplanes equipped to fire rocket projectiles include Hawker Typhoons, Hawker Hurricanes, Bristol Beaufighters, and Fairey Swordfish.

Similar arming of U. S. military airplanes is reported from Washington. Five American fighter airplanes have been so equipped and are now operating in China, Burma, India, and the Pacific. They are: the Republic P-47 Thunderbolt, the Lockheed P-38 Lightning, the North American P-51 Mustang, the Curtiss P-40 Warhawk, and the Bell P-39 Airacobra. In addition, carrier-based Grumman Avengers and Douglas Dauntless are said to have been fitted to fire rocket projectiles.

Artillery in Major Battles

Translated at the Command and General Staff School from a German article by Captain von Schönau in *Artilleristische Rundschau* May 1944.

WAR constantly drives the soldier to the adoption of emergency methods. In fact, in very few cases, owing to loss of men and matériel, is one able to count on the strength and equipment as set forth in the service regulations. The extensiveness of the theater of action and the rapid developments in the field of armament constantly give rise to new situations and possibilities with their resultant effects on the mode of combat. No one is able to foresee these changes in time of peace and make complete allowance for them through suitable training and equipment of the troops.

I. Attack

1. *Preparation.*—The perfection of defense weapons compels us today, more than ever before, to make thorough preparation, slighting not even the smallest details, for every attack, from the smallest assault detachment operation up to the major breakthrough. It must be the ambition of every troop commander to work out the assigned problem with the least possible expenditure of men and matériel. The reputation of a unit cannot be based on its losses, but must rest on its accomplishments.

Liaison between infantry and artillery is, above all things, of decisive importance. It is a great mistake for a commander to work out his plan of attack without discussing the situation with the artillery that has been assigned the task of cooperating with him, thus depriving his most valuable auxiliary arm of any choice in the matter.

The artillery liaison officer must, therefore, keep his eyes and ears constantly open, and immediately inform his commander whenever important decisions are being made or appear imminent.

2. *Movement of the artillery into position.*—The movement of an artillery battalion into position presents quite a different appearance today, on the eastern front, than it did in time of peace. It is true that the most

important horse-drawn and motorized batteries possess a complete battery headquarters detachment, but in one place there will be a scarcity of vehicles, horses, or other equipment, in another place, a shortage of officers and men, owing to the work of the enemy, to sickness, or to furloughs. In many cases, therefore, the battalion commander will be obliged to move his batteries into position with the help of very few men.

The batteries themselves, as far as the situation and terrain allow it, should be so disposed that their fire will not interfere with one another in close defense in the direction of their flanks. There must always be a sufficient field of fire for use in case of attack by tanks (600 meters, at least). Whenever possible, flank security in the form of an antitank obstacle should be sought. In this connection, marshes should be very carefully examined as to depth. Often a marshy area apparently impassable to tanks has shown a depth of only sixty centimeters with absolutely solid soil underneath, so that it could be crossed in many places by the enemy tanks.

The crews of the observation posts must be kept as small as possible to avoid unnecessary losses. For the control of fire, one observer, one noncommissioned officer as assistant observer, one signaller, and a runner suffice.

3. *Support of the attack.*—Artillery preparation is justified only when reconnaissance has previously determined the strength and location of the key points of the enemy position in a definite and accurate manner. It was—to cite an example—a pure waste of ammunition when, in an attack on an inhabited place, a ten-minute barrage by two artillery battalions was called for by the infantry, although reconnaissance had been able to establish in a general way only that the town, which was some four kilometers in length and two kilometers in breadth, was occupied

by the enemy, but not where the emplacements and strongpoints of the enemy were.

It must never be lost sight of by the artillery, that it is of decisive importance:

a. That the infantry companies reach the enemy with adequate shock and fire power.

b. That the penetration of the enemy's lines and breakthrough of the entire depth of the enemy's battle position is made possible with a minimum of loss.

The closer the attack draws to the enemy and the farther it progresses, the harder becomes the task of the main observation posts. The moment repeatedly arrives when enemy artillery has to be silenced or suppressed at just the very points where its suppression is most needed. It is precisely on this account that it is so important for the forward observers to establish immediate and direct connections with the attacking infantry. To prevent their being recognized as artillerymen, it is expedient that they advance with the skirmish lines. In spite of this, however, in the further course of the attack it will often not be easy for them to remain close to the infantry, for the latter are continually on the move while the former, being obliged to maintain their fire, are bound to one spot. But when they do leave their position and move forward again to rejoin the infantry, the artillery is again forced to cease firing. The infantry then becomes immediately and painfully aware of this by the intensification of the enemy's action; hence the infantry again calls to the forward observer. He, however, is absolutely unable to help them as yet. All these difficulties are taken care of by always assigning two forward observers for the "call battery" of the battalion from the very beginning, who alternate in accompanying the infantry, No. 1 conducting the fire while No. 2 advances. The more clearly the focal points of the enemy resistance are recognized during the course of the attack, the closer must be the cooperation between the infantry and the forward observers. But the infantry must make actual use of the artillery fire in making its advances. It often fails to do this. It has also proved to be ad-

visable for a battery commander to advance with the battalion making the main effort and always remain close to the battalion commander in order, in this way, to be able to exert a certain influence on the other forward observers and also, in case of emergency, to be able to control the fire in the place of the battalion commander.

Generally speaking, during the whole duration of the attack, all parts of the artillery must be imbued with an absolutely unbridled spirit of aggressiveness.

Under no circumstances must it happen that the forward observers are unable to act for the sole reason that no battery of the battalion is ready for fire. This should be borne in mind in making every change of position. Above all, the search for new firing positions should not take much time. The displacement should be to the first practical position from which the mission can be fulfilled.

Similar considerations apply to the observation posts. They must under no circumstances be rooted to one spot even though this means the abandonment of trenches that have cost a great deal of toil and labor.

4. *Finish of the attack.*—Once the attack objective has been reached, not a minute should be lost in preparing for defense. A completed position can now be occupied, order restored in the signal lines, and every facility established on a more secure basis. Measures must be taken without delay for organizing barrages and defense in every direction. It is, first of all, the task of the artillery to see immediately to the establishment of a firing chart.

II. Defense

1. *Command.*—If we compare the year 1917, let us say, with the year 1943, we see that war of position predominated in 1917, while today the vastness of the areas involved enables us to make use largely of mobile defenses and frequently of mobile warfare.

Artillery has shown itself, especially in defense, to be the backbone of the front. Very frequently—and this is always to be regarded as the most consummate of its accomplishments—it has, by means of its concentrated

fire, broken up the initial concentrations of the enemy. In innumerable cases, by means of its massed fire, it has put a bloody end to his attack before he ever reached our main line of defense. But wherever the enemy did succeed in penetrating into our positions, he was brought to a halt before the firing positions of our batteries.

The breadth of the combat sectors necessitates, as a rule, mobile conduct of operations and mobile employment of the artillery. Both strength and location of the positions must remain hidden from the enemy. The difficulties connected with regrouping must under no circumstances lead to a neglect of this, especially in case of a threatening attack.

In defense, close connection between infantry and artillery is even more important than in attack. The quieter conditions afford the infantry opportunity for assisting in the observation of the fire of its batteries and for acquiring an idea of what the latter are able to do. Finally, each company is able to say, "That is *our* battery commander! He will never fail us!"

2. Observation.—In defense, the infantry feels a still greater desire for forward observers. Unfortunately, places are frequently encountered where they are able to see nothing at all or, at the most, less than the main observation posts. If any objection is expressed, one receives the answer that only the forward observer who is exposed to the same battle influences as the grenadier is able to guarantee that the artillery will really deliver its fire where the infantry considers it necessary. But our forward observers, who have been trained at the cost of a great deal of pains and labor, are too hard to replace to expose them unnecessarily in such a way to being killed.

Woods and marshes often force us, in the eastern theater of operations, to locate the main observation posts in the front lines and supplement them by means of a number of lateral observers. The observation posts must be able not only to fire with their own batteries but also to adjust the fire of all other

batteries that are firing into their field of observation but are not able to see into it.

In defense, every battery commander must be ceaselessly on the alert for opportunities to improve his firing data. Under somewhat stabilized conditions, a sort of panoramic battery chart, a large, neatly drawn panoramic sketch showing all barrages, target points, and concentrations, along with the corresponding fire commands, as determined either by previous adjustment of fire on the point or by calculation, has proved its worth. Then, if the enemy breaks into the position, compelling the main observation post to shift its location, it is possible, in spite of this fact, to resume fire immediately and continue it.

3. Firing position.—In choosing firing positions, it should be borne in mind that today artillery participates in antitank defense to a greater extent than formerly. In order to obtain a clear field of fire for the combat of tanks at distances of not less than 600 meters, it is often necessary to locate positions on the front slope of a hill. In defense, it is of primary importance so to locate the batteries that they can support one another by means of flanking fire.

Every firing position must be gradually transformed into a small fortress against which any attack will be broken. All ingenuity, all love, all cleverness that can possibly be aroused in a battery, must be turned into account for this task. Slit trenches for protection against tank fire in the immediate vicinity of the guns have always paid dividends, even in the case of attacks by aviation. The greatest caution is advised in the employment of the natives of the region. Spies or enemy agents are always to be found among them who are able in one way or another to convey their knowledge to the enemy.

The combat of enemy planes by means of rifle or machine-gun fire often endangers the battery more than it protects it, because by this means its position, which in most cases is unknown to the enemy, is revealed to him. Enemy planes should, therefore, be fired on only when they have obviously already recognized the firing position, limber position, or

concentrations of forces and are engaged in attacking them.

4. *Channels of communication.*—In defense, the effectiveness of the artillery depends to a very large extent on the dependability of the channels of communication. In no place does one pay a higher penalty for careless work and work done in a manner contrary to the regulations than in this field. The greatest enemy of our wire conductors is motor traffic. Both elevated and buried lines save much trouble and vexation here. Secrecy in the transmission of messages must be carefully observed on the eastern front. Instead of destroying the lines, the partisans prefer to listen in on them and report the results by radio to the command posts of the Soviet army.

III. Training and Education

Even in battle, the training and education of the men is continued. Zeal, knowledge, and skill are increased if every operation is talked over with the subordinate leaders when it is finished or, better still, with the whole unit. The battery commander must take advantage of every opportunity to raise the level of

training and with it the combat value of his unit, and to train replacements for all positions, especially for the positions of observers, gunners, calculators, and radio operators. Forward observers may even be given practice in the battery position in the actual conduct of fire. During quiet periods, regular courses may be instituted in the battalion or regiment, even though they may have to be broken off before they are finished.

Under no circumstances must the mental side of military education be neglected, for on it the striking power of the forces depends. Men schooled in world-wide vision must be put to work here, without regard to rank. By the help of the army radio receiver and small groups listening together (in observation posts, fire positions, or limber positions), addresses by leading men and articles and speeches on the political and military situation can be brought to the knowledge of the entire battery. Every soldier must know what National Socialism aims at, must be convinced of the ultimate victory of Greater Germany, and must devote all his energy to the achievement of this end.

How the Germans Defend Buildings

An article in *Aim*, army magazine of the British Middle East Command.

ORTONA is a small seaside town on the east coast of Italy about forty miles north of Termoli. The Canadians who landed there did plenty of street-fighting, and what they have to say about Ortona gives us some valuable tips about German methods of defending buildings.

As at Cassino, the Hun seems to have studied the Russian tactics at Stalingrad with profit. He has learned how to use ruins, interconnected with tunnels. Many people who landed at Ortona expected to find lots of concrete pillboxes—but not one was encountered. You know how reports get around; because every house in a west coast town was found to have been turned into a pillbox and in some cases dummy villas had

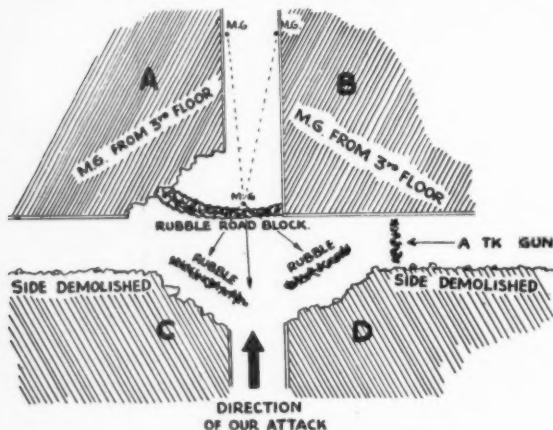
been built round concrete works, pillboxes have become all the rage and people expect to find them everywhere.

Far from it. One of the big lessons of Ortona was: Don't expect to find the same thing twice.

The Canadians at Ortona noticed that the Hun used what he had got. He dug slit trenches and machine-gun posts outside houses, fifty to a hundred yards away, siting them so that all sides of the house were covered by cross-fire. He sandbagged the lower floors of houses and used them as pillboxes. Sometimes, too, he dug slit trenches *inside* houses on the ground floor or basement, making it extremely difficult for the Canadians to knock out the defenders.

In one instance, a machine gun was mounted on a table and built in by sandbags within the room itself, with a field of fire

There may be an antitank gun, too, either in the rubble across the road or in the side street, sited to fire at point-blank range.



DEFENSE OF A STREET INTERSECTION.

through the window. Heaven help the poor devils who had to fire it; the noise must have jiggered up their eardrums for days afterwards.

Ortona, a typical Italian town, is a honeycomb of intersections and little streets and small blocks of houses. Most houses had cellars, as many as six being linked together by underground passages. The main defenses were closely-knit mutually-supporting machine-gun positions covering all intersections.

The diagram shows a typical street crossing. The corners of "A," "C," and "D" blocks have been destroyed to provide rubble for closing the road. The sides of blocks "C" and "D" have been blown so that the attackers cannot bring observed fire on to the German positions. The defenders have machine guns on the second and third stories of blocks "A" and "B," and there's another machine gun firing from behind the rubble in the road.

What with this and mines and booby traps liberally sprinkled about the rubble piles, attacking tanks have an exceedingly tough time of it. The houses themselves are booby-trapped, of course, and time bombs are by no means uncommon.

Notice how the Germans vary their defenses of buildings according to the type of town and houses. North Ortona is more modern—wider streets and numerous open squares—and this part of the town was the tougher problem for the attackers.

Here the enemy defenses centered on a series of strong-points, heavily armed with machine guns covering all streets and squares. Some buildings had been demolished to increase the field of fire, and the rubble in the streets invariably sheltered two or three more machine-gun posts, which were supported by the machine guns sited in nearby houses.

Manholes (or "mouseholes" as they were nicknamed) were skilfully used by the defenders. They were just big enough for a man to crawl through, and linked room to room and house to house. They allowed quick entrance and exit and the Germans used them to re-occupy houses already cleared so that they could harass the Canadians from the rear. German night raiders and demolition parties also wriggled, unseen, in and out through these "mouseholes," which were not always spotted at first by the troops who were clearing the houses, and which were often concealed behind furniture.

German Assault Forces of the Air

Translated and digested at the Command and General Staff School from a German article in *Berliner Börsen-Zeitung* 14 July 1944.

IN the Reich's defense against Anglo-American terror attacks, as has been emphasized recently in the official communiqués, there have been employed, of late, special new formations of day fighters which have now proved their high value in service. These are the assault groups whose task it is to engage the enemy in close combat. These assault units of the German Luftwaffe constitute the expression of the determined will to resist enemy terror bombings. They represent the latest development of attack methods of German pursuit formations. The increased quantitative commitment of enemy air forces, especially the increase in the fighter protection of the enemy, has met with a clear reply in the unbridled spirit of the attack of the German fighter forces. These daring and fanatical defenders of the German homeland are given an opportunity, in the assault squadrons, of conducting their fighting just as they, in their hotheadedness, have desired.

Among the members of the assault squadrons we find officers and men who have been deeply hit by the brutal terror bombings of the enemy, who have had everything taken from them that they possessed, that they have loved and held dear—their families and their homes. They have been living with the aim of getting at the enemy and destroying him even at the most reckless risk of their own lives.

Hence, they have dedicated themselves with great enthusiasm to their preparation for the task. With unparalleled boldness and unbounded aggressiveness they plunge upon the enemy. They know no danger, no obstacle, since they have but the one aim before them—the destruction of the enemy! Even the wild defense fire from hundreds of enemy weapons does not hold back the men of the assault squadrons. Their fighting is done with singleness of purpose at the closest of ranges and frequently develops into a duel in which the assault forces of the air are able to glimpse the terrified faces of their opponents.

Even when the planes of the assault squadrons are riddled by bullets, the assault forces of the air maintain contact and make their own decisions regarding the plan of attack that in each particular case will lead to the destruction of the enemy. When assault pilots have spent their ammunition, there still remains to them one means of attack—the ramming of the plane! Our assault forces of the air plunge into the big enemy bombers and drag them after them in their plunge to earth.

The enemy now recognizes in the men of the assault squadrons an adversary who chooses a manner of fighting in which German soldiery is revealed in its highest perfection.

The Capture of Cherbourg

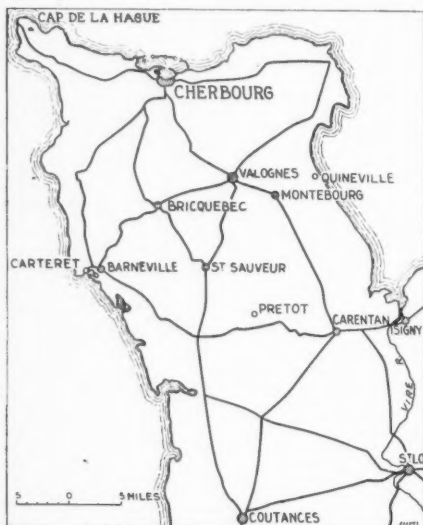
An article by Lieutenant Colonel R. M. Raynsford in *The Fighting Forces* (Great Britain) August 1944.

WHEN it is a question of bringing to bear massive mechanical might against the enemy the American army has shown that it has nothing to learn from anybody, and indeed as regards fighting qualities pure and simple, American troops, thanks to the intensive training they had received in the British Isles and to the battle experience which many

of them had received in Tunisia, Sicily, and Italy, showed in the Cherbourg campaign that they had achieved a high, in fact a magnificent, standard. In the fighting in Tunisia, American troops, at the outset of the fighting, incurred some considerable set-backs. This was due to undue recklessness and failure to take adequate precautions. But the lesson

was quickly learned, as one might expect from the men of a proud, free, and highly intelligent nation, and in any case, recklessness is not wholly a defect in military operations. Readiness to take a chance, provided ways and means have been carefully thought out beforehand, is, on the contrary, a military virtue, and is certainly preferable to too great rigidity in planning.

In the Cherbourg campaign enormous risks were taken. But the risks were justified, and



as a result the American campaign in the Cherbourg peninsula will go down in history as one of the most daring and most successful operations in the annals of history.

Infinite credit should, however, be given to General Montgomery, the Supreme Army Commander of the invading forces. His motto has always been to hit and to keep on hitting. He had instilled this dictum into General Bradley, who commanded the American troops in the Cherbourg peninsula and most splendidly did General Bradley carry out his instructions. By sheer weight of arms the American troops blasted a way through whenever the Germans made a stand.

We will start this account of the capture of Cherbourg from 16 June, on which day the three American divisions involved were holding a semicircular bulge stretching from Quineville on the east coast, through Montebourg—part of which was still in enemy hands—thence almost due south to Prétot, whence the line circled east around Carentan to a point about two miles south of the little port of Isigny.

By nightfall on the 16th, St. Sauveur, on the main road running south from Valognes to Coutances, was captured and thereafter things began to move rapidly. St. Sauveur was captured by the 82d Airborne Infantry Division which had fought in Sicily. This advance westwards was carried forward right to the west coast of the peninsula by the 9th Division, which had also fought in North Africa and Sicily. By noon on the 18th, Carteret and Barneville-sur-Mer were in American hands, after forty-eight hours' severe fighting. By this brilliant dash the Cherbourg peninsula was cut in half, and Cherbourg itself was isolated, to say nothing of the German forces in the north. The German 77th Division, led by tanks, made a vicious attempt to break south, but the northern flank of the 9th Division held firm and the Germans retreated to Briquebec, heavily strafed from the air.

In the south, American advance troops entered St. Lo, the center of important road and rail communications, but were forced to retire.

The move forward from St. Sauveur to Carteret constituted an advance of ten miles on a frontage of about six miles, and one might have expected General Bradley to have stopped to consolidate his position, but true to his mission of "hitting and keeping on hitting" he ordered the 9th Division to pursue the retreating German 77th Division. They made a five-mile advance and occupied Briquebec. German opposition was very meager and many hundreds of German prisoners were taken.

Meanwhile, Montebourg had been completely bypassed by troops advancing along the coast. Valognes was also in process of be-

ing enveloped, and was actually captured on 20 June. Montebourg was vacated by the Germans on 19 June.

By 21 June, American troops were starting to penetrate the outer defenses of Cherbourg, which lay about six miles from the town.

Air reconnaissance showed that Cherbourg had been badly damaged by air attacks and naval shelling, and the Germans had by now started to make extensive demolitions.

On the east coast an advance of five miles had been made, north of Quineville; indeed from the east coast to the west coast of the peninsula the American offensive was pressing forward relentlessly, while the Germans retired to the immediate defenses of the port.

The outer defenses, as we stated above, consisted of a semicircle of strongpoints about six miles outside the town. Further in was another semicircle of strongpoints, and finally a third ring of seven forts containing big coastal guns. It is to be noted, however, that the fortifications were naturally designed against attack from the sea or from the flanks across the horns of the peninsula. To the south of the port the defenses were not very highly organized. General Bradley showed that he had no intention of wasting time about the final capture of the port. On 22 June an all-out attack was launched against the fortifications, by land, sea, and air. The perimeter was about twenty miles in extent. Hundreds of American and British medium bombers and fighter-bombers plastered the German positions on the high ground around Cherbourg. Marauders, Havocs, and Thunderbolts carried out constant bombing attacks to clear the way for the American infantry. The defensive area on the south was turned into "a wasteland of rubble and flame." A German officer broadcasting in the German forces program said: "Our lives have been turned sour by the hundreds of enemy heavy and light bombers and swarms of fighter-bombers and low-flying fighters which are constantly attacking us."

One correspondent described the bombardment as probably the greatest land-air attack in history. Though the main American

attack came from the south, American troops on the right flank, striking at Cherbourg from the east, helped enormously in giving the final *coup de grâce*.

Three hill features dominate Cherbourg. By 23 June one of them had been captured. By 24 June American troops had penetrated the German outer defense line to a depth of more than two miles in most places. Advanced troops had reached a point only a mile from the harbor. On 25 June coastal defenses of the port were heavily bombarded by Allied battleships. German troops began to surrender in hundreds. On the night of 25 June the German News Agency stated that it could be assumed that the Americans had taken possession of Cherbourg.

Undoubtedly the heavy naval bombardment, which started on the 25th, contributed to a very large extent to the capitulation of Cherbourg. On this day a very strong Allied naval force moved up well within range of the notoriously tough shore defenses and opened fire with a rain of shells. Some ships took a position as close as 8,000 yards from the shore. There were in the first place a series of fierce gun duels before the land batteries were sufficiently neutralized to allow of fire being shifted to enemy strongpoints inland in support of the advancing army.

The naval forces engaged were under the command of Rear Admiral Morton L. Deyo, USN, who flew his flag in the USS *Tuscaloosa*. The force included three American battleships, *Texas*, *Nevada*, and *Arkansas*, one heavy American cruiser, *Quincy*, two British cruisers, *Enterprise* and *Glasgow*, and a group of American and British destroyers. At noon on 25 June this force made a rendezvous in the Channel off the Cherbourg peninsula and broke the silence of a calm, bright Sunday with the first salvo from the 14-inch guns of the USS *Nevada*. The other battleships and cruisers quickly opened on their assigned targets, the heavily case-mated shore batteries flanking Cherbourg. Particular accuracy was required, as American troops were known to be concentrated close to the target areas.

The enemy shore batteries lost no time in replying with heavy fire. As the Allied ships swept up and down in plain view of the French coast, enemy shells fell close among them. As the fire grew more intense, destroyers laid a smoke screen behind which the bombardment continued. The answering fire dropped off significantly as the naval shells found their mark.

The bombardment of the enemy coastal batteries and strongpoints inland lasted for some three hours.

The minesweeping forces, which consisted of British and U. S. flotillas of fleet sweepers, did magnificent work during this operation.

The report that Cherbourg had fallen, issued by the German News Agency on the night of the 25th, was an intelligent anticipation, though it was obvious that the German situation had become desperate. By nightfall on the 26th the remaining two hill features dominating Cherbourg were in American hands, many American troops had reached the waterfront, and some, in fact, had penetrated to the docks. Roughly one-third of Cherbourg had been captured, although bitter fighting with grenade and bayonet was still going on in the streets. Actually a good many points of resistance had been bypassed in order to strike a blow at the heart of Cherbourg, notably the battered airfield at Maupertus, on the east of the town.

All that now remained to be done was the mopping up of remnants of the enemy still holding out in the extremities of the Cherbourg peninsula, and the reduction of four forts situated on the breakwater. Maupertus airdrome surrendered on 28 June and the four forts on 30 June.

On 2 July a communiqué from Supreme Allied Headquarters announced that the liberation of the Cherbourg peninsula was complete, and that the last enemy resistance in

the Cap de la Hague ceased early on the morning of 1 July.

Thus ended a most brilliant operation, "an indication," as General Bradley said, "to the enemy of what he can expect from now on to the end." The operation was carried out by the American 7th Corps, of which the 9th Division took a very prominent part. This division was the first to reach the western coast of the peninsula and took part in the final phase, when it captured the extreme northwestern point of Cap de la Hague.

Approximately 35,000 prisoners were taken during the course of the operation.

The principal prize in this small campaign was, of course, the port of Cherbourg itself. Cherbourg is one of the finest deep-water harbors in Europe. The outer road, which has an area of 1,250 acres of water, is protected by a massive granite breakwater nearly three miles long, and affords safe anchorage for the largest ships afloat in all weathers.

It has two entrances, one one-and-a-half miles wide and the other three-quarters of a mile wide. The harbor cannot be completely blocked by the enemy, and eventually the outer road alone will provide room for 100 of the largest merchant ships.

The inner harbor is tidal: it has a water area of sixteen acres and 1,968 feet of quays. Three ships, each of 10,000 tons, can be accommodated at Homet Pier alone, where the depth of water is thirty feet at the lowest tides.

The Germans did all in their power to make the port useless. But whatever ingenuity they displayed in blocking the entrance and in fouling the harbor with mines and other traps, the Port Construction and Repair Companies of the British and American Army and the Naval Salvage Unit, with their long experience in building and repairing harbors—and with their knowledge of German methods in the Mediterranean—were restoring the port with the utmost speed.

There is nothing in war which is of greater importance than obedience.

—Clausewitz

The Chinese Army

Digested at the Command and General Staff School from an article by Colonel J. V. Davidson-Houston, MBE, in *Journal of the Royal United Service Institution* (Great Britain) May 1944.

THE present Chinese Army came into existence some fifteen years ago. Before that time the country was infested with regional and provincial forces, whose rapacious war lords had maintained a state of inconclusive civil war since the revolution of 1911. In 1927, however, the Nationalists under Chiang Kai-shek defeated the Northern combination and succeeded in establishing an administration at Nanking which during the next ten years consolidated its position as the recognized Central Government.

The Nationalists (Kuomintang), as soon as they had strengthened their hold over the Yangtze Valley, broke with the Chinese Communist Party and dismissed the Soviet Military Mission which had aided them in their campaign. In 1928 a mission composed of unemployed officers from the German Army was inaugurated at Nanking and began to train Chiang Kai-shek's forces on modern lines. The Germans realized China's industrial limitations, and their teaching was based upon a high proportion of automatic weapons and the use of mortars in place of artillery. For the organization and training of their air forces the Chinese relied upon Powers then regarded as paragons of the flying world, and there were contacts with Great Britain, the United States, and Italy.

After the signing of the Anti-Comintern Pact and the outbreak of Sino-Japanese hostilities in 1937, it was anomalous to find the German Mission still with the Chinese forces, and it was withdrawn in 1938. The Germans had worked conscientiously, but limitations of material had prevented the organization on modern lines of more than a minor fraction of China's vast army. Oil, motor transport, and practically all types of gun and shell had to be imported from abroad. The air force, owing to financial limitations and the lack of an aircraft industry, never exceeded about a hundred first-line machines,

and its heterogeneous nature militated against efficient maintenance.

It will be evident from the above that the Chinese army, in addition to its material difficulties, suffers from a lack of tradition and modern military experience. The resources of manpower, which amount theoretically to at least 20,000,000, are composed of stoical peasants who, well led, could make good soldiers. The "bottle-neck" in this respect is the supply of officers. The low esteem in which the profession of arms was formerly held hindered the provision of men of high character and education, although this situation has improved since national war superseded civil strife.

The administrative services are not yet fully developed. During the Civil Wars the armies lived on the country, moving from one area to another as the local resources became exhausted. Transport was usually impressed, and railway stock was requisitioned without regard to the effect on the transportation service. The low standard of training of the "coolie armies" made it easier for a war lord to enlist fresh soldiers than to spend money on recovering the sick and wounded. During the Burma campaign of 1942 the Chinese Expeditionary Force was fed by the British supply service, while motor transport was also provided from India. The medical organization was furnished by the Chinese Red Cross, assisted by various voluntary bodies from abroad. Such deficiencies are gradually being remedied, but the creation of these services under the prevailing conditions of war is bound to be a slow and difficult process, necessitating large-scale training and considerable imports of material. At present such imports can only be made by air.

It must be remembered that China, like other countries, suffers from the perennial struggle between the enlightened expert and the representative of vested interests. While

there are a number of highly qualified technical and administrative officers trained in foreign schools and armies, "Colonel Blimp" also has his counterpart in the Middle Kingdom.

As already stated, the Chinese soldier possesses certain valuable qualities, chief among which are his capacity for long marches, high endurance, and a lack of imagination which preserves his morale in circumstances which might tell on the nerves of more sensitive peoples. His standards of discipline, however, differ from ours; minor offenses are often punished more severely, whereas orders are not expected to be carried out as literally as is the case in Western armies. This is due to the extreme individualism which characterizes Chinese thought and action. Upon these qualities have now been superimposed, in the case of certain formations, the benefits of American equipment and training; it will be interesting to observe the effects of this upon the fighting ability of Chinese troops in the forthcoming campaign.

A theory which gained support for many years was that China's lack of war material relegated her forces to a guerrilla role, but this idea has been discredited for the following reasons:

a. Guerrilla operations will not of themselves defeat large modern armies. They can only be effective in cooperation with regular forces by weakening the enemy at the decisive point through harassing his rear areas and forcing him to make detachments.

b. Guerrillas depend upon the cooperation of the local inhabitants. Guerrilla raids, having no decisive effect but calling down reprisals upon the civil population, thus tend to a constantly diminishing return.

The "Red" or "Communist" armies have proved an embarrassment rather than the help which was expected. It has apparently not been possible to close the breach which occurred in 1928 between Chiang Kai-shek and the Opposition forces; the much publicized Eighth Route Army, which before 1937 was importunate in its demand for war

with Japan, has taken no effective part in the struggle and is at present containing a large number of Government troops owing to its refusal to obey the orders of the Generalissimo.

Following their policy in Manchuria, the Japanese have been recruiting Chinese to maintain the authority of the puppet administration which they have set up in occupied territory. These troops are of value only for internal security, could not be relied on to fight against Marshal Chiang's forces, and may confidently be expected to change their allegiance when times appear favorable.

It is obvious, from what has been said, that China requires large imports of material in order that she may be militarily effective. At present there are only two routes by which such help could be given:

- a. Soviet Turkestan-Sinkiang-Kansu.
- b. By air across Burma.

In 1937 and 1938 a certain quantity of Russian aircraft and motor vehicles were made available by the first route. Russia's existing preoccupations, however, and her evident desire not to embroil herself with Japan at present, have for some time closed this door; moreover, the distances involved and the roughness of the road from the Russo-Chinese frontier will prevent it from being an adequate supply route until a great deal of work has been done upon it.

Material is constantly being flown into China by transport aircraft from India, but the quantities that can be so carried are naturally severely limited and can never be adequate under present conditions. The recapture of Burma will open up the sea-land route Rangoon-Lashio-Kunming, but here again considerable work remains to be done before this tenuous line of communication can support a large-scale campaign in China. We should make ready, therefore, for the execution of considerable road and rail programs in Burma as soon as that country is released from the simian clutches of the common enemy.

Operations of Motorized Infantry and Tanks

Translated at the Command and General Staff School from a Russian article by Lieutenant Colonel P. Kolomeyts in *Krasnaya Zvezda* (Red Star) 12 February 1944.

THE maintenance of a rapid tempo of advance is a very important and complicated problem in the operations of mobile units. In prolonged battles, motorized infantry and tanks are at a disadvantage, for the basis of their action is flexible and rapid maneuvering along the front, combined with a rapid advance toward assigned objectives. Prolonged

such action. For here the strength of a daring and well organized maneuver, based on a thorough account of the situation and a skilful exploitation of the forces at hand, found its full expression.

Operating as part of the forces assigned to the exploitation of a breakthrough, the brigade was fighting its way to the south-



battles tying mobile units to a limited sector of the front are to be avoided.

It should be noted, however, that practical application of this theory is difficult, for on the battlefield one always encounters numerous obstacles which hamper the maneuverability of mobile units. This should be taken into account and, what is most important, measures should be taken to remove the obstacles which prevent the mobile units from fully utilizing their basic quality—speed of action. Here much depends on the skill of the commander, i.e., on his ability to use all the forces and weapons available in order to gain time and space necessary for maneuvering.

The battle in which the X Mechanized Guards Brigade participated, commanded by Colonel Babadzhanyan, is characteristic of

west, to the left of a railroad (see sketch). So far, everything was going smoothly. An adjacent tank unit, cooperating with the brigade, was a little ahead of it, and had approached the village of Chernorudka from the east by 2:00 AM. Here the tanks encountered strong enemy resistance and took cover in the surrounding country. But the commander of the tank unit did not want to waste time. He at once ordered a group of tanks to outflank the settlement from the right. The tanks, by a deep turning movement, reached the railroad and cut it a few kilometers southwest of Chernorudka. Here the tanks stopped, having thus created favorable conditions for the subsequent operations of the approaching motorized infantry. But they had accomplished only part of the task.

It was yet necessary to knock out the enemy from Chernorudka. This was to be done rapidly, without engaging in a prolonged battle. In other words, the battle had to be carried out in a rapid tempo. This mission was skillfully accomplished by Colonel Babadzhanyan. Let us describe the events as they occurred.

Having been informed that our tanks at Chernorudka were engaged by the enemy, Babadzhanyan went there to investigate the situation. The first man he met was a staff officer driving from the direction of Chernorudka. He said that the tanks were marking time at Chernorudka, where the enemy had only a few guns and nothing more. Quite different information was supplied by the commander of the tank unit, whom Babadzhanyan saw later. He reported the situation clearly and plainly. Close to the eastern outskirts of the village the enemy had a considerable concentration of artillery and other fire means. Some of our tanks had been knocked out as soon as they approached the enemy position.

While talking, the commander of the tank unit and Babadzhanyan climbed a hill. At the same moment the enemy opened fire at our dispositions. Observing the fire activity of the Germans, Babadzhanyan saw clearly the situation and made a decision. The idea was simple: combination of fire and maneuver. He decided to neutralize the enemy by a concentrated fire and by doing so to secure the maneuver of his infantry and tanks. The subsequent course of events will show how this maneuver was executed. Let us see now how Babadzhanyan succeeded in attaining fire superiority over a strong enemy.

Having placed his own and the attached artillery, as well as the mortar units, in open positions, he concentrated their fire on the sector where enemy firing positions were located. Under the cover of this fire, the motorized infantry and the supporting tanks occupied their position of departure in a hollow east of the village. The results of the artillery and mortar action soon manifested themselves. Babadzhanyan noticed from his observation post that German machines began leaving Chernorudka in a disorderly man-

ner, heading to the southeast. This meant that the enemy had been forced to abandon his prepared positions and was now hardly able to offer organized resistance. Taking advantage of this situation, Babadzhanyan ordered his units to launch the assault.

One battalion supported by tanks outflanked the village from the right. Another battalion outflanked it from the left, while frontal blows were inflicted by a battalion of motorized and tank-supported infantry. The attack developed in a rapid tempo. Soon the village was gripped in pincers. The infantry and the tank group operating on the right flank reached the railroad station (in the western part of Chernorudka). The battalion attacking frontally broke into the village and went right through to its opposite end. All exits from the village in the direction of Malaya Cherniavka were seized by the battalion operating on the left flank. The enemy formation was dismembered and caught in the pincers. About six hundred Germans were surrounded and wiped out. The enemy left a great amount of motor vehicles and matériel in the streets of Chernorudka.

But the battle was not finished. It still remained to knock out the enemy from several populated places located along the brigade's axis of advance. It was necessary to operate rapidly in order to deny the Germans time and space for the execution of a counter-maneuver. Without losing a minute, Babadzhanyan launched an assault against Malaya Cherniavka, which was occupied by the Germans. Motorized infantry and tanks attacked the village by the shortest route, i.e., from the front, while the adjacent tank unit attacked the Germans from the west, along the highway. Malaya Cherniavka was captured without halting. Its garrison withdrew in a hurry to the southwest.

Colonel Babadzhanyan had the following principles to which he adhered strictly: Once you get hold of the enemy, do not let him escape; having attained an advantage in maneuvering, exploit it to the end; and keep the initiative firmly in your hands. Now he was guided by the same principles. The tank unit cooperating with the brigade was delayed in

Malaya Cherniavka for refueling while the motorized infantry and the tanks of Colonel Babadzhanyan moved without delay to the next populated place—Bolshaya Cherniavka. Part of the forces attacked frontally, while the remaining units outflanked the village and approached it from the west. The German garrison defending the village was almost entirely annihilated.

Very interesting was the next move of Babadzhanyan. He undertook a brilliant maneuver, which looked risky at first. The units of the brigade stopped for some time in Bolshaya Cherniavka for refueling and repairs. But Babadzhanyan would not slacken the tempo of the attack. He concentrated all his artillery and moved it toward Sestrinovka. Having approached the enemy position at a distance of one to two kilometers, the artillery deployed and opened an intense fire.

This was very fortunate, for while the shelling was in full swing the adjacent tank unit reached the village. Taking advantage of the powerful artillery support, the tanks broke into Sestrinovka and captured it. The streets of the village were jammed with hundreds of vehicles abandoned by the Germans. As a rule, the Germans manage, under the pressure of our troops, to save their vehicles in order to escape in time, but the maneuver of our tanks and artillery was so unexpected and swift that the enemy did not have time to do it.

An interesting engagement took place after the seizure of Sestrinovka. Without stopping in the village, the tanks moved on. The commander of the tank unit which entered the village first informed Babadzhanyan that more than 300 Germans with three tanks and six armored personnel carriers had gone into the woods west of Sestrinovka. At that time the motorized infantry was on the way to the village and only the artillery was available.

Babadzhanyan decided to place his artill-

ery along the edge of the village facing the woods where a considerable enemy group was located. So the artillery occupied the designated positions. But later on, Babadzhanyan changed his mind and ordered the artillery to be removed. He thought that the remnants of the defeated enemy in the woods would hardly be able to start any active operations, and besides, our motorized infantry had already reached the village. The artillery battalion left the western outskirts of Sestrinovka and moved on.

But against all expectations, the enemy did suddenly launch a counterattack from the woods along the highway leading from Sestrinovka to Makharintzy. The German infantry, deployed in a long line, was supported by tanks. Although the attack of the enemy at the flank of our moving columns was unexpected, he encountered organized resistance on the part of our battalion which was moving from Sestrinovka to Makharintzy. Having deployed right from the march formation, our motorized infantry took the Germans under the fire of automatic weapons. An artillery battalion happened to be in the vicinity. It deployed quickly and also opened fire. A furious engagement developed under the direct and firm command of the Colonel. The battle ended in a rout of the Germans. Their infantry was completely wiped out and two tanks and three armored vehicles were set on fire. Only four Fascist vehicles managed to escape to another village, which was soon captured by our motorized infantry.

Continuing to exploit its success, the brigade together with other units reached Kazatin. The battle of Kazatin requires a special analysis. But what has been described above is sufficient to illustrate the nature of maneuvering employed by motorized infantry and tanks and the importance of conducting a battle in a rapid tempo. And this is exactly what Colonel Babadzhanyan achieved when he routed a numerically superior enemy.

Ask me for anything but time.

—Napoleon

The Triumph of Soviet Tanks

An article from a Russian source by Major General Stromberg in
The Tank (Great Britain) July 1944.

THE first World War provided tank troops with very valuable but limited practical experience. The theory of employment of large tank formations for operations in depth was tested only in the course of this war, and especially in the last three years, on the Soviet-German front. This experience seems, at the first glance, to lead to two contradictory conclusions.

Experience of German tank troops might lead us to conclude that their development has exhausted its potentialities and has reached a crisis. This is borne out by the immense and irreparable losses sustained by German tank troops, the steady decline in productive capacity of the German tankbuilding industry, and equally steady decline in the operational effect of employment of tanks.

The experience of Soviet tank troops, on the other hand, would indicate that tanks have become one of the principal and decisive arms. Their employment, especially in large-scale operations, is becoming more and more effective.

Which of these two conclusions is nearer the truth? Or maybe they are both wrong and a correct conclusion cannot yet be drawn?

In the second World War the German General Staff tried to correct the fatal mistake of underestimating the value of tanks made in the first World War. In their plans for Blitzkrieg they assigned a prime place to tanks, alongside aircraft.

But, as in all their plans, the Germans overrated the role of tanks and underrated the role of other arms. On the other hand, while they overrated their own tanks, they underrated Soviet tanks and the ability of Soviet commanders to employ them as effectively as, if not more effectively than, themselves. Adventurist plan for Blitzkrieg demanded not so much quality as quantity from the German tankbuilding industry. Nor did the plan leave the Germans time to equip

their army commander with more powerful tank models.

Banking on quantity rather than quality the Germans had by 1941 raised the number of their tanks to 14,000. This number, in the opinion of tank commanders, would be enough to win the Blitzkrieg, which was pictured as a triumphal march to the Ural Mountains. But another fundamental blunder followed, namely, the underestimation of the importance of adequate tank reserves and their training.

Thanks to the suddenness of their attack and their numerical superiority in tanks and aircraft, the Germans were able to score temporary successes in the early part of the war. But only a few months elapsed and the Soviet troops drove the German tanks from a path of triumph to a path of ignominy and disgrace. The Germans' first successes were followed by a series of defeats.

Consequently, it is not tanks in general which are undergoing a crisis as an arm of warfare, but only German tanks. The chief reasons for this, apart from inadequate improvements, inequality of tanks, and diminished output in tankbuilding industry, are defective German strategy, the stereotyped nature of German tactics, and poor quality of "totalized" tank troops.

That the German tank troops are in the throes of a crisis is borne out by the experience of Soviet tanks. Repeated victories of Soviet tanks in the region of Moscow and Rostov in 1941, in the region of Stalingrad and North Caucasus in 1942, in the region of Kursk and Dnieper, Korsun, Uman, Krivoyrog, West Ukraine, and Rumania in 1943 and 1944, show that if properly employed, if their action is coordinated with that of other arms, if as much attention is paid to the quality of tanks as to their quantity, if they are supplied with tank defense weapons, and if they have adequate reserves of highly trained and morally staunch men, tanks can be one of the most effective and decisive arms.

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